608-CD-001-004

EOSDIS Core System Project

ECS Operations Plan for Release B

This document has not yet been approved by the Government for general use or distribution.

January 1998

Raytheon Systems Company
Upper Marlboro, Maryland

ECS Operations Plan for Release B

January 1998

Prepared Under Contract NAS5-60000
CDRL Item #115

RESPONSIBLE OFFICE

Thomas J. Hickey /s/ 1/30/98

Thomas J. Hickey, Maintenance and Operations Manager Date
EOSDIS Core System Project

SUBMITTED BY

Patrick M. O'Connell /s/ 1/30/98

Patrick O'Connell, Project Manager Date
EOSDIS Core System Project

Raytheon Systems Company
Upper Marlboro, Maryland

608-CD-001-004

This page intentionally left blank.

Preface

This ECS Operations Plan for Release B is a ECS Contract baseline document that includes all current modifications and is not reflecting the ECS Replan or Version 2 baseline.

This document is a formal contract deliverable with an approval code 1. It is issued once for each ECS Release. It requires Government review and approval prior to acceptance and use. Changes to this document also require Government approval prior to acceptance and use. Changes to this document shall be made by document change notice (DCN) or by complete revision.

Once approved, this document shall be under ECS Project Configuration Control.

Any questions should be addressed to:

Data Management Office
The ECS Project Office
Raytheon Systems Company
1616 McCormick Dr.
Upper Marlboro, MD 20774-5372

This page intentionally left blank.

Abstract

The ECS Operations Plan provides a description of the way in which the system will appear to it's users/operators and the way in which they will interact with the system. It details how operational tasks will be performed on the system. It represents a consensus between development, support, and user groups on the conceptual operation of the overall system and serves as an information source during design, implementation, and testing of the system.

This version applies to Release B.

Keywords: operators, users, design, implementation, testing, staffing, training, scenarios, operations concept, AM-1, ASTER, CERES, MISR, MODIS, MOPITT, LANDSAT-7, ETM+, METEOR, SAGE III, JASON, MR, DFA, ADEOS II, SeaWindS.

This page intentionally left blank.

Change Information Page

List of Effective Pages	
Page Number	**Issue**
Title	Submitted as Final
iii through xii	Submitted as Final
1-1 through 1-4	Submitted as Final
2-1 and 2-2	Submitted as Final
3-1 and 3-2	Submitted as Final
4-1 and 4-2	Submitted as Final
5-1 through 5-6	Submitted as Final
A1 and A-2	Submitted as Final
B-1 through B-6	Submitted as Final
C-1 through C-6	Submitted as Final
D-1 through D-6	Submitted as Final
E-1 through E-6	Submitted as Final
F-1 and F-2	Submitted as Final
G-1 through G-4	Submitted as Final
H-1 and H-2	Submitted as Final
I-1 and I-2	Submitted as Final
J-1 and J-2	Submitted as Final
K-1 through K-4	Submitted as Final
L-1 through L-8	Submitted as Final
AB-1 and AB-2	Submitted as Final

Document History			
Document Number	**Status/Issue**	**Publication Date**	**CCR Number**
608-CD-001-001	Submitted as Final	March 1995	95-0160
608-CD-001-002	Submitted as Final	July 1995	95-0438
608-CD-001-003	Submitted as Final	March 1997	97-0441
608-CD-001-004	Submitted as Final	January 1998	98-0059

This page intentionally left blank.

Contents

5. Staffing Plans

Tables

Appendix A. ASF DAAC Staffing Plan

Appendix B. EDC DAAC Staffing Plan

Appendix C. GSFC DAAC Staffing Plan

Appendix D. JPL DAAC Staffing Plan

Appendix E. LaRC DAAC Staffing Plan

Appendix F. Deleted

Appendix G. NSIDC DAAC Staffing Plan

Appendix H. ORNL DAAC Staffing Plan (ECS Contractor Functions Only)

Appendix I. SMC Staffing Plan

This page intentionally left blank

1. Introduction

The Earth Observing System (EOS) Data and Information System (EOSDIS), as the National Aeronautics and Space Administration's (NASA) overall Earth Science discipline data system, provides the ground system for the collection and analysis of science data to support scientists in resolving the dynamics of the Earth's components and the processes by which they interact. As a part of the EOS Program, EOSDIS supports: the planning, scheduling, and control of the EOS series of spacecraft; exchanging commands, data and algorithms with the European Space Agency (ESA), Japan, Canada, the National Oceanic and Atmospheric Administration (NOAA), and any other non-NASA entities involved in the overall EOS mission; the coordination of these activities with other data gathering systems; and the transformation of the observations into physical variables, providing for higher levels of processing and presenting the data to users in forms that facilitate and stimulate interactive scientific research. The portion of EOSDIS addressed in this document is the EOSDIS Core System (ECS).

The ECS is based on the functional and performance capabilities required by the baseline EOSDIS design. The ECS provides the ground facilities and procedures to support and operate the EOS mission. This includes planning and scheduling science instruments usage, generating real-time and stored command sequences to be sent to the spacecraft instruments, processing production data (Level 0) from EDOS to higher levels, and coordinating scheduling of product generation at the DAACs and data transfers between DAACs that support product generation. ECS also provides information management, data archive, and data distribution functions for other NASA Earth science flight missions, NASA Earth science instruments flown on non-NASA flight missions, and for other NASA held Earth science data.

1.1 Scope

ECS operational elements are or will be deployed to the institutions shown below:

- Distributed Active Archive Centers (DAACs):
  - Alaska SAR Facility (ASF) — University of Alaska-Fairbanks, Fairbanks, Alaska
  - EROS Data Center (EDC) — Sioux Falls, South Dakota
  - Goddard Space Flight Center (GSFC) — Greenbelt, Maryland
  - Jet Propulsion Laboratory (JPL) — Pasadena, California
  - Langley Research Center (LaRC) — Hampton, Virginia

  - National Snow and Ice Data Center (NSIDC) — University of Colorado, Boulder, Colorado
  - Oak Ridge National Laboratory (ORNL) — Oak Ridge, Tennessee
- System Monitoring Center (SMC) — GSFC Building 32, Greenbelt, Maryland
- EOS Operations Center (EOC) — GSFC Building 32, Greenbelt, Maryland
- ECS Sustaining Engineering Organization (SEO) — ECS Development Facility, Upper Marlboro, Maryland
- ECS System Integrated Logistics Support (ILS) — ECS Development Facility, Upper Marlboro, Maryland

This plan addresses management of the maintenance and operations (M&O) hardware, software, and personnel resources of ECS deployed to these locations.

1.2 Document Organization

The Data Item Description (DID) 608/OP1, Contract Data Requirements List (CDRL) 115, reads as shown in Table 1-1.

Table 1-1. ECS Operations Plan Data Item Description

ECS Operations Plan
Provides a description of the way in which the system will appear to it's users/operators and the way in which they will interact with the system. Details how operational tasks will be performed on the system. Represents a consensus between development, support, and user groups on the conceptual operation of the overall system. Serves as an information source during design, implementation, and testing of the system. Includes provisions for software operations and scenarios supporting software operations and the training required. Training plans shall define the function of any necessary training facilities in personnel training and the methods by which newly trained personnel will be phased into system operations with minimum effect on those operations. The Operations Plan shall also include the staffing plans necessary to implement the Contractor's operations concept.

This document responds to the SOW and DID and is organized into the following sections and appendices:

- Section 1 Introduction. Introduces EOSDIS and this document.
- Section 2 Related Documentation. Lists documents that drive, support or expand on the material in this plan.
- Section 3 Release B Operations. Summarizes the operations of the system in the Release B time frame.
- Section 4 Training Plans. Describes the approach to Release B unique training requirements.
- Section 5 Staffing Plans. Describes the staffing plan assumptions.
- Alaska SAR Facility DAAC Appendix.
- EROS Data Center DAAC Appendix.
- Goddard Space Flight Center DAAC Appendix.
- Jet Propulsion Laboratory DAAC Appendix.
- Langley Research Center DAAC Appendix.
- National Snow and Ice Data Center DAAC Appendix.
- Oak Ridge National Laboratory DAAC Appendix.
- System Monitoring and Coordination Center Appendix.
- EOS Operations Center Appendix.
- M&O Management, Sustaining Engineering Organization and System Integrated Logistics Support Appendix.
- DAAC Staffing Models Appendix. Provides information on staffing models of key DAAC positions
- Abbreviations and Acronyms.

This page intentionally left blank.

2. Related Documentation

2.1 Parent Documents

The parent documents are the documents from which this document's scope and content are derived.

423-41-01	Goddard Space Flight Center, EOSDIS Core System (ECS) Statement of Work
423-41-03	Goddard Space Flight Center, EOSDIS Core System (ECS) Contract Data Requirements Document

2.2 Applicable Documents

The following documents are referenced within this document, or are directly applicable, or contain policies or other directive matters that are binding upon the content of this volume.

194-501-PA1	Performance Assurance Implementation Plan for the ECS Project

2.2.1 Contract Modification 30

CCR 505-01-41-086E	EBnet Consolidation

2.2.2 Contract Modification 48

CCR 505-01-41-117A	Transfer DAS Processing from ESDIS to DAO; Add ADEOS II/SeaWinds and RADAR ALT (Including F&PRS Appendix C Requirements Adjustments Based on February 1996 Technical Baseline) (Topic 1)
CCR505-01-41-143D	Remove ECS Support for SeaWinds and RADAR ALT product Generation (Topic 1)

2.2.3 Contract Modification 52

CCR 505-01-41-079	Distributed Active Archive Center (DAAC) Hours of Operations (Topic 1)
CCR 505-01-41-107	LaRC Research Center (LaRC) M&O Transition, Staff Consolidation (Topic 3)
CCR 505-41-14-005B	Marshall Space Flight Center (MSFC) DAAC Deletion (Topic 2)

2.2.4 Contract Modification 53

CCR 505-01-41-135D	Implement ECS Stop Work Order (Topic 1)

2.2.5 Contract Modification 61

CCR 505-01-41-150C	Consolidate Snow and Ice DAAC Operations Staff (Topic 1)
CCR 505-01-41-151A	Consolidate Physical Oceanography DAAC Operations Staff (Topic 2)

2.3 Information Documents

Several ECS documents provide additional information or influence elements of this plan.

101-101-MG1	Project Management Plan for the ECS Project
104-CD-001	Data Management Plan for the ECS Project
107-CD-001	Level 1 Master Schedule for the ECS Project
193-103-MG3	Configuration Management Procedures for the ECS Project
193-105-MG3	Data Management Procedures for the ECS Project
193-205-SE1	Science User's Guide and Operations Procedure Handbook for the ECS Project
193-212-SE2	User Requirements Study Report for the ECS Project
194-102-MG1	Configuration Management Plan for the ECS Project
194-302-DV2	ECS Facilities Plan for the ECS Project
194-602-OP1	Property Management Plan for the ECS Project
220-CD-001	Communications Requirements for the ECS Project
222-TP-003	Release Plan Content Description for the ECS Project
601-CD-001	Maintenance and Operations Management Plan for the ECS Project
604-CD-001	ECS Operations Concept for the ECS Project: Part 1 -- ECS Overview
613-CD-003	COTS Maintenance Plan for the ECS Project
614-CD-001	Developed Software Maintenance Plan for the ECS Project
622-CD-001	Training Plan for the ECS Project

3. Release B Operations

This section describes how the system will appear to it's users/operators in Release B. Release B represents the initial EOS AM launch ready configuration of ECS, including functionality described by the ECS Specification for mission operations and the capacity to perform initial post-launch science processing for EOS AM, in addition to the functions, services and data provided by previous releases. The release provides full functionality to support the LANDSAT-7, METEOR/SAGE III, ADEOS II/SeaWindS, and JASON/MR & DFA missions. The release also provides the capacity to support Integration and Test (I&T) of new science algorithms and ECS upgrades in parallel with production operations. The functionality to be provided is as follows:

Information Management and Archive functions:

- Full functionality and performance including:
  - Network access and distribution of data holdings
  - Subsetting
  - Security
  - Hard media shipping and handling
  - Access to all authorized users
  - Interoperability with ADCs and Version 0
- Launch ready for:
  - EOS AM-1 (ASTER, CERES, MISR, MODIS and MOPITT instruments)
  - METEOR (SAGE III instrument)
- Capability to migrate all Version 0 data to ECS archive
- Information management services at ORNL
- Data distribution/access and selected high order product archive data at ASF

Science Processing functions:

- Full functionality and performance including:
  - Algorithm environment for final I&T for AM-1
  - ESN interfaces

- Launch ready for:
  - EOS AM-1 (ASTER, CERES, MISR, MODIS and MOPITT instruments)
  - LANDSAT-7 (ETM+ instrument)
  - METEOR (SAGE III instrument)
  - JASON (MR and DFA instruments)
  - ADEOS II (SeaWindS instrument)

Mission Operations functions:

- Full functionality and performance including:
  - Flight operations
  - Institutional interfaces (e.g., FDF, SN, NCC), EDOS and Ecom
- Launch ready for EOS AM-1
- Full instrument and spacecraft testing support for EOS AM-1

Networks functions:

- Full functionality and performance

System Management functions:

- Full functionality and performance

CDRL Item 112, DID 604, the ECS Operations Concept Document, contains specific operations scenarios for the system, in general, and all releases through Release B. The document describes the way in which the system's users/operators interact with the system. It also details how operational tasks are performed on the system.

CDRL Item 113, DID 605, Operations Scenarios, describes the operability of the system design through the use of representative science data processing and system administration sequences (scenarios). The scenarios include operations activity flows, operator actions and system actions-responses.

CDRL Item 109, DID 601, Maintenance and Operations Management Plan, describes the functions that are performed at each operational and maintenance center. It also provides scenarios for intra-center and inter-center coordination, configuration management, and change control.

CDRL Item 119, DID 613, COTS Maintenance Plan, and CDRL Item 120, DID 614, Developed Software Maintenance Plan, describe the software maintenance concepts used to maintain the ECS configuration items.

4. Training Plans

The ECS Training Plan, CDRL Item 128, DID 622, defines the training required to prepare personnel to operate, maintain and utilize the ECS in support of EOS missions. It describes, curriculum and schedule for Contractor training of EOS management, investigator, technical, operations and maintenance personnel. The Release B training requirements and approach are documented in DID 622.

The following sections describe the training drivers for this release.

4.1 Training Requirements

Release B training of M&O personnel will include the following topic areas:

- Hardware operations (system administration, performance and tuning)
- Hardware maintenance
- Software operations (COTS SW, modified COTS SW and project-developed SW)
- Software sustaining engineering
- Network management
- System orientation, procedures and security
- Data base administration
- Spacecraft operations
- Site specific topics

These requirements will be satisfied using a combination of project-developed training and training provided by COTS vendors. Training types will be formal classroom training and On-the-Job Training (OJT). Training courses and objectives will be oriented to achieving certification requirements.

Classroom instructors and OJT instructors will be trained and prepared for instructing personnel at their sites by one or more trainers sent to the site for Train-the-Trainer (TTT) instruction. The site management is responsible for selecting individuals to receive TTT and implement classroom and OJT instruction required. These individuals will also be qualified to certify or assist in the certification of personnel in the areas of expertise they are selected to teach.

4.2 Training Schedule

Preliminary training will be held prior to CSR to provide system familiarization for personnel who will support acceptance test activities. Initial training for Release B will occur between CSR and approximately two months following RRR. This training will provide personnel with the

requisite skills to operate the system prior to AM-1 launch. Additional training will be provided as required to prepare all M&O personnel for certification. Certification of FOS M&O personnel will be accomplished within three months of launch, and certification of all other M&O personnel within two months of launch.

4.3 Impact of Training on Operations

Training and certification will be planned so as to create minimal impact on operations. Selection of personnel will match certification criteria as closely as possible. Once hired and oriented to the project, new personnel will be screened for ability in all skill areas, and training will be planned for those areas where deficiencies exist. After training has been accomplished, certification testing will be conducted, and once successful results are obtained, permanent assignment will be made. All events associated with this training and certification are the responsibility of site management (SMC, EOC or DAAC) with certification criteria and scheduling support offered by M&O.

Site management will determine the best times for training and certification based on operational commitments, the availability of training support necessary, and the impact training or a delay in training will have on the site.

4.4 Training Locations

Locations for Release B training will be either vendor locations (in the case of most COTS courses) or the EDF, SMC, EOC or applicable DAAC. When operations schedules allow and cost effective to do so, training will be conducted on the operational HW and SW. For training occurring at the DAACs, training facilities should meet both the functional requirements of the training (accommodation of personnel, requisite HW and SW for hands-on training, etc.) and the basic standards for training facilities as stated in the Contractor Provided Training Specification (535-TIP-CPT-001). It is the responsibility of the SMC, EOC or applicable DAAC to ensure that training facilities, support equipment, and schedules are adequate to accomplish training objectives.

5. Staffing Plans

The staffing plans:

- Are based on staffing analyses used for the Apr-97 submittal of the Contract Modifications shown in Section 2.2.
- May be adjusted to respond to trades during the design, implementation, testing of the releases.
- May be adjusted to respond to experience in operations.
- Have been edited to address the period of Jan-98 through Oct-02. Staffing levels prior to Jan-98 have been deleted from the material.

The staffing estimates cover the following:

- Management, sustaining engineering, operations and/or support at the following locations:
  - ASF
  - EDC
  - GSFC
  - JPL
  - LaRC
  - NSIDC
  - ORNL
  - SMC
- Custom & COTS software maintenance for all ECS Releases.
- Hardware maintenance and computer operations for all ECS hardware delivered during period of contract.
- WAN monitoring and system monitoring and coordination.

The following ground rules and assumptions have been used to develop this staffing:

- Staffing levels as a function of time may be adjusted by ECS Contractor management action.

- ECS mission responsibilities are as shown in Table 5-1. Staffing estimates at JPL, LaRC, NSIDC and ORNL for scope outside of the ECS contract are also included in this document

- Hours of operations are as shown in Table 5-2.

Position descriptions are contained in DID 607. Table 5-3 maps the M&O functions to the key activities described in DID 604, the Operations Concept Document, Part 2B, Section 4.

Table 5-1. Release B Mission Baseline

Mission	Launch Date	ASF	EDC	GSFC	JPL§	LaRC§	NSIDC§	ORNL§
Landsat 7	May-98		ETM+*					
AM1	Jun-98		ASTER, MODIS	MODIS		CERES, MISR, MOPITT	MODIS	
METEOR	Aug-98					SAGE III		
ADEOS II**	Feb-99				SWS*			
JASON (aka RADAR ALT)**	Mar-99				MR* DFA*			
Other		RADAR-SATα, ERS-1α, ERS-2α, JERSα		DAO*				
Version 0@	Yes	Yes	Yes	Yes	Yes	Yes	~~Yes~~	Yes

Notes: * Data archive and distribution only

** See Appendix L regarding ADEOS II and JASON missions

@ Data migration, archive and distribution

α Data distribution and selected data archive

§ ECS' scope limited to on-site support services.

Table 5-2. Hours of Operations

Site	Hours of Operations						
	Starting on						
	Jan-96 **Ir-1 CSR**	**Dec-96** **Rel A RRR**	**May-97** **TRMM L-3 Mo.**	**Sep-97** **Rel B RRR**	**Mar-98** **L-7 L-3 Mo.**	**Apr-98** **AM-1 L-3 Mo.**	**Jun-98** **AM-1 Launch**
SMC		24 hrs/day 5 days/week	24 hrs/day 7 days/week	24 hrs/day 7 days/week	24 hrs/day 7 days/week	24 hrs/day 7 days/week	24 hrs/day 7 days/week
ASF	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week
EDC	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	16 hrs/day 7 days/week	16 hrs/day 7 days/week	24 hrs/day 7 days/week
GSFC *Prime Shift*	8 hrs/day 5 days/week	8 hrs/day 5.5 days/week	8 hrs/day 7 days/week	8 hrs/day 7 days/week	8 hrs/day 7 days/week	8 hrs/day 7 days/week	24 hrs/day 7 days/week
Other Shifts		16 hrs/day 5 days/week	16 hrs/day 5 days/week	16 hrs/day 5 days/week	16 hrs/day 5 days/week	16 hrs/day 5 days/week	
JPL	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week
LaRC*	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	24 hrs/day 7 days/week	8 hrs/day 5 days/week
NSIDC*	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 7 days/week	8 hrs/day 7 days/week
ORNL	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week	8 hrs/day 5 days/week

Note: * ECS staff's primary hours of coverage are 5 days/week, 8 hours/day.

Table 5-3. Mapping of M&O Functions to Science Data Processing and System Management Key Activities (1 of 3)

Activity	Activity Description	Functional Title
Pull Users and User Services	User registration	DAACs: DAAC User Services Representative SMC: Not applicable
	User reporting and assistance	DAACs: DAAC User Services Representative SMC: Not applicable
	Data ordering and tracking	DAACs: DAAC User Services Representative SMC: Not applicable
	User statistics	DAACs: DAAC User Services Representative SMC: Not applicable
Information Management	Metadata	DAACs: DAAC User Services Representative; DAAC Science Data Specialist; DAAC Database Administrator SMC: Not applicable
	Data management	DAACs: DAAC User Services Representative; DAAC Science Data Specialist; DAAC Database Administrator SMC: Not applicable
Data Input	Level 0 data ingest	DAACs: DAAC Production Monitor SMC: Not applicable
	Electronic ingest of ancillary and other level 0 data	DAACs: DAAC Production Monitor SMC: Not applicable
	Media ingest of ancillary and other non-level 0 data	DAACs: DAAC Ingest/Distribution Technician SMC: Not applicable
	Version 0 (V0) data migration	DAACs: DAAC V0 Data Migration Operator SMC: Not applicable
Data Storage	Working storage and data archival	DAACs: DAAC Archive Manager SMC: Not applicable
Data Distribution	Electronic data distribution	DAACs: DAAC User Services Representative SMC: Not applicable
	Media distribution	DAACs: DAAC Ingest/Distribution Technician SMC: Not applicable

Table 5-3. Mapping of M&O Functions to Science Data Processing and System Management Key Activities (2 of 3)

Activity	Activity Description	Functional Title
Production Planning	Plan creation	DAACs: DAAC Production Planner SMC: Not applicable
	Plan activation/cancellation	DAACs: DAAC Production Monitor SMC: Not applicable
	Planning data base modification	DAACs: DAAC Production Planner SMC: Not applicable
	Plan view/monitoring	DAACs: DAAC Production Monitor SMC: Not applicable
	Standard production request	DAACs: DAAC Production Planner SMC: Not applicable
	On-demand production request	DAACs: DAAC Production Planner SMC: Not applicable
	Reprocessing production request	DAACs: DAAC Production Planner SMC: Not applicable
	Planning failure recovery	DAACs: DAAC Production Planner SMC: Not applicable
Production Execution & Processing	Production processes	DAACs: DAAC Production Monitor SMC: Not applicable
Science SW Integration and Test	Initial delivery	DAACs: DAAC Science SW Support Engineer SMC: Not applicable
	Science SW update	DAACs: DAAC Science SW Support Engineer SMC: Not applicable

Table 5-3. Mapping of M&O Functions to Science Data Processing and System Management Key Activities (3 of 3)

Activity	Activity Description	Functional Title
System Management	Resource planning	DAACs: DAAC Resource Planner SMC: Not applicable
	Resource management	DAACs: DAAC Resource Manager SMC: Resource Manager
	Security management & accountability	DAACs: DAAC Resource Manager SMC: SMC Security Controller
	WAN network management	DAACs: Not applicable SMC: Not applicable
	Performance management	DAACs: DAAC Resource Manager; DAAC Resource Planner SMC: SMC Performance Analyst; SMC Network Analyst
	System administration	DAACs: DAAC System Administrator SMC: SMC System Administrator
	Configuration management	DAACs: DAAC CM Administrator SMC: SMC CM Administrator
	Accounting and billing	DAACs: Not applicable SMC: SMC Billing Clerk; SMC Accountant

Appendix A. ASF DAAC Staffing Plan

Staffing levels for ECS maintenance and operations at the ASF DAAC are shown in Table A-1.

Changes between this plan and the Jul-95 plan are summarized in Table A-2. Additional staffing model information is contained in Appendix L.

Table A-1. ASF DAAC ECS Maintenance and Operations Staffing Plan (Headcount)

ASF_608_Jan_98 Function	 Jan-98	Rel B.1 RRR - 2 months Jul-98	Rel B.1 RRR Sep-98	End of Contract Nov-02		
DAAC ECS Contr. Mgr & DAAC AA		0.5	0.5			
DAAC Ops Readiness & Perf. Assur.						
DAAC Engineering/Science Liaison	1.0	1.0				
DAAC System Engineer		0.5	0.5			
DAAC SW Maintenance Engineer		0.6	0.6			
DAAC System Test Engineer		0.2	0.2			
DAAC Database Administrator		1.0	1.0			
DAAC Resource Planner						
DAAC CM Administrator		0.2	0.2			
DAAC ILS Administrator		0.5	0.5			
DAAC Maintenance Coordinator		0.5	0.5			
DAAC Science SW I&T Support Engr.						
DAAC Science Coordinator						
DAAC User Services Representative		1.0	1.0			
DAAC Science Data Specialist			1.0			
DAAC Operations Supervisor						
DAAC Production Planner						
DAAC Production Monitor						
DAAC Resource Manager			0.4			
DAAC Archive Manager			0.6			
DAAC Ingest/Distribution Tech.						
DAAC V0 Data Migration						
DAAC Computer Operator						
DAAC System Administrator		1.0	1.0			
Total MM = 420.0 MM	1.0	7.0	8.0			

Table A-2. Justification for ASF Staffing Changes

Position	Summary Basis of Estimate/Rationale
DAAC Assistance Engineer	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Oct-02. DID 608 (Jan-98) staffing: 0.0 throughout period. DID 608 (Jul-95) included this position included as a place holder against eventual transition of M&O responsibilities from the ECS Contractor to the ASF DAAC. This transition is not covered by this analysis and has been deleted in the DID 608 (Jan-98) staffing
DAAC User Services Representative	Appendix L discusses the general staffing model for User Services Representative.
DAAC Science Data Specialist	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Oct-02. See Section L for a thorough discussion of the estimation model.
DAAC Computer Operator & DAAC System Administrator	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Mar-98; 4.7 Apr-98 through Oct-02. DID 608 (Jan-98) staffing implements 7 days/week, 24 hours/day by adding a computer operator who is trained to deal with HW and SW failures/aborts, and/or to call for assistance from the day staff or SMC as needed.

Appendix B. EDC DAAC Staffing Plan

Staffing levels for ECS maintenance and operations at the EDC DAAC are shown in Table B-1.

Changes between this plan and the Jul-95 plan are summarized in Table B-2. Additional staffing model information is contained in Appendix L.

Table B-1. EDC DAAC ECS Maintenance and Operations Staffing Plan (Headcount) (1 of 2)

EDC_608_Jan_98	AM-1 L-6 mo	L-7 L-3 Mo	AM-1 Launch			AM-1 L+12 mo
Function	**Jan-98**	**Mar-98**	**Jul-98**	**Oct-98**	**Jan-99**	**Jul-99**
DAAC ECS Contr. Mgr & DAAC AA	2.0	2.0	2.0	2.0	2.0	2.0
DAAC Ops Readiness & Perf. Assur.	0.5	0.5				
DAAC Engineering/Science Liaison						
DAAC System Engineer	5.0	5.0	5.0	5.0	5.0	5.0
DAAC SW Maintenance Engineer	2.0	3.0	3.0	3.0	3.0	3.0
DAAC System Test Engineer	1.0	2.0	2.0	2.0	2.0	2.0
DAAC Database Administrator	2.0	3.0	3.0	3.0	3.0	3.0
DAAC Resource Planner	0.5	0.5	1.0	1.0	1.0	1.0
DAAC CM Administrator	1.0	1.0	1.0	1.0	1.0	1.0
DAAC ILS Administrator	1.0	1.0	1.0	1.0	1.0	1.0
DAAC Maintenance Coordinator	1.0	1.0	1.0	1.0	1.0	1.0
DAAC Science SW I&T Support Engr.	2.5	2.5	2.5	2.5	2.5	1.0
DAAC Science Coordinator	1.0	1.0	1.0	1.0	1.0	1.0
DAAC User Services Representative	1.0	1.0	4.0	5.0	5.0	5.0
DAAC Science Data Specialist	2.0	2.0	2.0	2.0	2.0	2.0
DAAC Operations Supervisor	0.5	1.0	1.0	1.0	1.0	1.0
DAAC Production Planner	0.5	1.0	1.0	1.0	1.0	1.0
DAAC Production Monitor	1.0	3.1	4.7	4.7	4.7	4.7
DAAC Resource Manager	1.0	3.1	4.7	4.7	4.7	4.7
DAAC Archive Manager	1.0	1.0	1.0	1.0	1.0	1.0
DAAC Ingest/Distribution Tech.	1.0	3.1	4.7	4.7	4.7	4.7
DAAC V0 Data Migration					3.1	3.1
DAAC Computer Operator	1.0	2.1	3.7	3.7	3.7	3.7
DAAC System Administrator	2.0	2.0	2.0	2.0	2.0	2.0
Total MM = 2959.6 MM	30.5	41.9	51.3	52.3	55.4	53.9

Table B-1. EDC DAAC ECS Maintenance and Operations Staffing Plan (Headcount) (2 of 2)

EDC_608_Jan_98 Function	Jan-01	End of Contract Nov-02				
DAAC ECS Contr. Mgr & DAAC AA DAAC Ops Readiness & Perf. Assur. DAAC Engineering/Science Liaison	2.0					
DAAC System Engineer DAAC SW Maintenance Engineer DAAC System Test Engineer	5.0 3.0 2.0					
DAAC Database Administrator DAAC Resource Planner DAAC CM Administrator	3.0 1.0 1.0					
DAAC ILS Administrator DAAC Maintenance Coordinator DAAC Science SW I&T Support Engr.	1.0 1.0 1.0					
DAAC Science Coordinator DAAC User Services Representative DAAC Science Data Specialist	1.0 5.0 2.0					
DAAC Operations Supervisor DAAC Production Planner DAAC Production Monitor	1.0 1.0 4.7					
DAAC Resource Manager DAAC Archive Manager DAAC Ingest/Distribution Tech.	4.7 1.0 4.7					
DAAC V0 Data Migration DAAC Computer Operator DAAC System Administrator	 3.7 2.0					
Total MM = 2959.6 MM	50.8					

Table B-2. Justification for EDC Staffing Changes (1 of 3)

Position	Summary Basis of Estimate/Rationale
DAAC Assistance Engineer	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Oct-02. DID 608 (Jan-98) staffing: 0.0 throughout period. DID 608 (Jul-95) included this position included as a place holder against eventual transition of M&O responsibilities from the ECS Contractor to the EDC DAAC. This transition is not covered by this analysis and has been deleted in the DID 608 (Jan-98) staffing
DAAC Database Administrator	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Feb-98; 2.0, Mar-98 through Oct-02. DID 608 (Jan-98) staffing: 2.0, Jan-98 through Feb-98; 3.0, Mar-98 through Oct-02. Change is based on the recommendation of the DAAC received in a letter from the CO on 24-Oct-97: (NAS-60000; Data Item Description (DID) 608, ECS Operations Plan for Release B, April 1997), EDC Comment 3.2-12.
DAAC Maintenance Coordinator	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Feb-98; 2.0, Mar-98 through Jun-98, 4.7, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Oct-02. The DID 608 (Jul-95) staffing covered Ir-1 to the end of contract. This staffing covers Release A to the end of contract. The most significant part of the change, however, is not putting the position onto each operational shift but, rather, having the position as a day support function. This is based on the maintenance concept of using vendor labor for COTS HW maintenance. On-shift personnel will be provided with procedures and call lists to work-around and coordinate HW failures.
DAAC Science SW I&T Support Engineer	DID 608 (Jul-95) staffing: Algorithm Technical Support Engr, 1.0, Mar-98 through Oct-02. Algorithm I&T Support Engr, 2.0, Mar-98 through Oct-02. DID 608 (Jan-98) staffing: 2.0, Jan-98 through Oct-02. See Section L for a thorough discussion of the estimation model.
DAAC User Services Representative	DID 608 (Jul-95) staffing: 4.0, Mar-98 through Oct-02.. DID 608 (Jan-98Apr-97) staffing: 1.0, Jan-98Jun-97 through Jun-98; 4.0, Jul-98 through Sep-98; 5.0, Oct-98 through Oct-02.. Appendix L discusses the general staffing model for User Services Representative.Table L-3 shows the volume of science data archived each day at the DAAC. A model of 1 User Services representative per 100,000 MB, but not less than 1.0 MM/M was used.
DAAC Science Data Specialist	DID 608 (Jul-95) staffing: 2.0, Jan-98Jun-97 through Oct-02.. DID 608 (Jan-98Apr-97) staffing: 3.0, Jan-98Jun-97 through Oct-02. The DID 608 (Jan-98Apr-97) staffing is based on 1 staff member per instrument team shown in Table 5-1 except at EDC where the number of Science Data Specialists is 2.0. This is . based on the recommendation of the DAAC received in a letter from the CO on 24-Oct-97: (NAS-60000; Data Item Description (DID) 608, ECS Operations Plan for Release B, April 1997), EDC Comment 3.2-18.This model has been used throughout the staffing analysis.

Table B-2. Justification for EDC Staffing Changes (2 of 3)

Position	Summary Basis of Estimate/Rationale
DAAC Operations Supervisor	DID 608 (Jul-95) staffing: 0.5, Mar-98 through Oct-02. DID 608 (Jan-98) staffing: 0.5, Jan-98 through Feb-98; 1.0, Mar-98 through Oct-02. DID 608 (Jan-98) staffing starts the supervisor earlier to improve support to acceptance testing and operations transition for Release B. The position was raised to 1 MM/M to reflect the scope and complexity of operations at the DAAC.
DAAC Production Planner	DID 608 (Jul-95) staffing: 0.5, Mar-98 through Oct-02. DID 608 (Jan-98) staffing: 0.5, Jan-98 through Feb-98; 1.0, Mar-98 through Oct-02. DID 608 (Jan-98) staffing starts the production planner earlier to improve support to acceptance testing and operations transition for Release B. The position was raised to 1 MM/M to reflect the scope and complexity of operations at the DAAC.
DAAC Production Monitor	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Feb-98; 2.8, Mar-98 through Jun-98; 9.4, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Feb-98; 3.1, Mar-98 through Jun-98; 4.7, Jul-98 through Oct-02. This staffing is based on 1 person per shift to monitor both MODIS and ASTER processing. While the number of MODIS PGEs executing per day is quite high, the number of ASTER PGEs is modest. This staffing profile is based on the level of automation and quality of the monitoring tools available to this function. It is further substantiated by experience at the University of Miami with Autosys in which monitoring of processing is a part time job by one of the staff members.
DAAC Resource Manager	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Feb-98; 2.8, Mar-98 through Jun-98; 5.7, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Feb-98; 3.1, Mar-98 through Jun-98; 4.7, Jul-98 through Oct-02. The DID 608 (Jan-98) staffing approach provides 1 person per operational shift and eliminates the additional day shift position contained in the DID 608 (Jul-95) plan. This reduction is justified by the level of monitoring and life cycle services being provided by the MSS COTS and custom SW components.
DAAC Archive Manager	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Feb-98; 2.8, Mar-98 through Jun-98; 6.7, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Oct-02. The DID 608 (Jan-98) staffing approach provides 1 person per day to monitor trends, plan long-term strategies, etc., for use of the archive. The DID 608 (Jul-95) approach had staff members on each operational shift, backed up by additional staff on weekday day shifts. This reduction is justified by the level of automation and monitoring and life cycle services being provided by the data server and MSS COTS and custom SW components. Further, the NCAR facility in Boulder, CO, runs similar robotic archives and has not found a need for on-shift monitoring by a dedicated staff member.

Table B-2. Justification for EDC Staffing Changes (3 of 3)

Position	Summary Basis of Estimate/Rationale
DAAC Ingest/Distribution Tech.	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Feb-98; 4.0, Mar-98 through Jun-98; 7.0 Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Feb-98; 3.1, Mar-98 through Jun-98; 4.7, Jul-98 through Oct-02. See Section L for a thorough discussion of the estimation model.
DAAC V0 Data Migration Operator	DID 608 (Jul-95) staffing: 0.0. DID 608 (Jan-98) staffing: 3.1, Jan-99 through Dec-00. The DID 608 (Jan-98) staffing is consistent with the effort included in WBS 8 by Change Order 1. Labor was allocated to the DAACs to cover the periods of V0 data migration as described in the "Proposed ECS Plan for V0 Data Migration (Operations Phase)", 12-Aug-96. The staff at each DAAC was based on the volume of data to be migrated: • ASF: 0.1 TB • EDC: 13.0 TB • GSFC: 10.0 TB • JPL: 2.0 TB • LaRC:: 3.0 TB • NSIDC: 0.1 TB Staffing was replanned to assume the effort will start in Jan-1999.
DAAC Computer Operator & DAAC System Administrator	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Feb-98; 2.8 Mar-98 through Jun-98; 5.7, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 3.0, Jan-98 through Feb-98; 4.1, Mar-98 through Jun-98; 5.7, Jul-98 through Oct-02. System Administrator positions in the DID 608 (Jan-98) staffing approach is based on 1 SA for every 25 computers (including the office environment). In addition the DID 608 (Jan-98) staffing approach adds a computer operator to support the on-shift Resource Manager, Production Monitors, and Ingest/Distribution Technician and to perform system backup and other administrative tasks. This around the clock staffing starts at 3 months prior to Landsat-7 launch.

This page intentionally left blank.

Appendix C. GSFC DAAC Staffing Plan

Staffing levels for ECS maintenance and operations at the GSFC are shown in Table C-1. Labor associated with DAO is included in this section.

Changes between this plan and the Jul-95 plan are summarized in Table C-2. Additional staffing model information is contained in Appendix L.

Table C-1. GSFC DAAC ECS Maintenance and Operations Staffing Plan (Headcount) (1 of 2)

GSFC_608_Jan_98	AM-1 L-6 mo	AM-1 L-3 mo	AM-1 Launch		AM-1 L+12 mo	
Function	**Jan-98**	**Apr-98**	**Jul-98**	**Jan-99**	**Jul-99**	**Jan-00**
DAAC ECS Contr. Mgr & DAAC AA	2.0	2.0	2.0	2.0	2.0	2.0
DAAC Ops Readiness & Perf. Assur.	0.5	0.5				
DAAC Engineering/Science Liaison						
DAAC System Engineer	5.0	5.0	5.0	5.0	5.0	5.0
DAAC SW Maintenance Engineer	3.0	3.0	3.0	3.0	3.0	3.0
DAAC System Test Engineer	2.0	2.0	2.0	2.0	2.0	2.0
DAAC Database Administrator	3.0	3.0	3.0	3.0	3.0	3.0
DAAC Resource Planner	0.5	0.5	1.0	1.0	1.0	1.0
DAAC CM Administrator	2.0	2.0	2.0	2.0	2.0	2.0
DAAC ILS Administrator	1.0	1.0	1.0	1.0	1.0	1.0
DAAC Maintenance Coordinator	1.0	1.0	1.0	1.0	1.0	1.0
DAAC Science SW I&T Support Engr.	4.5	4.5	4.5	4.5	2.0	2.0
DAAC Science Coordinator	1.0	1.0	1.0	1.0	1.0	1.0
DAAC User Services Representative	1.0	1.0	4.0	4.0	4.0	5.0
DAAC Science Data Specialist	1.0	1.0	1.0	1.0	1.0	1.0
DAAC Science Data Specialist (DAO)	1.0	1.0	1.0	1.0	1.0	1.0
DAAC Operations Supervisor	1.0	1.0	1.0	1.0	1.0	1.0
DAAC Production Planner	1.0	1.0	1.0	1.0	1.0	1.0
DAAC Production Monitor	1.0	4.7	4.7	4.7	4.7	4.7
DAAC Resource Manager	2.0	4.7	4.7	4.7	4.7	4.7
DAAC Archive Manager	1.0	1.0	1.0	1.0	1.0	1.0
DAAC Ingest/Distribution Tech.	1.0	4.7	4.7	4.7	4.7	4.7
DAAC V0 Data Migration				3.1	3.1	3.1
DAAC Computer Operator	1.0	3.7	3.7	3.7	3.7	3.7
DAAC System Administrator	2.0	2.0	2.0	2.0	2.0	2.0
Total MM = 3123.4 MM	38.5	51.3	54.3	57.4	54.9	55.9

Table C-1. GSFC DAAC ECS Maintenance and Operations Staffing Plan (Headcount) (2 of 2)

GSFC_608_Jan_98 Function	Jan-01	End of Contract Nov-02				
DAAC ECS Contr. Mgr & DAAC AA	2.0					
DAAC Ops Readiness & Perf. Assur.						
DAAC Engineering/Science Liaison						
DAAC System Engineer	5.0					
DAAC SW Maintenance Engineer	3.0					
DAAC System Test Engineer	2.0					
DAAC Database Administrator	3.0					
DAAC Resource Planner	1.0					
DAAC CM Administrator	2.0					
DAAC ILS Administrator	1.0					
DAAC Maintenance Coordinator	1.0					
DAAC Science SW I&T Support Engr.	2.0					
DAAC Science Coordinator	1.0					
DAAC User Services Representative	6.0					
DAAC Science Data Specialist	1.0					
DAAC Science Data Specialist (DAO)	1.0					
DAAC Operations Supervisor	1.0					
DAAC Production Planner	1.0					
DAAC Production Monitor	4.7					
DAAC Resource Manager	4.7					
DAAC Archive Manager	1.0					
DAAC Ingest/Distribution Tech.	4.7					
DAAC V0 Data Migration						
DAAC Computer Operator	3.7					
DAAC System Administrator	2.0					
Total MM = 3123.4 MM	53.8					

Table C-2. Justification for GSFC Staffing Changes (1 of 3)

Position	Summary Basis of Estimate/Rationale
DAAC Maintenance Coordinator	DID 608 (Jul-95) staffing: 3.0, Jan-98 through Sep-98, 7.7, Oct-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0 Jan-98 through Oct-02. The most significant part of the change is not putting the position onto each operational shift but, rather, having the position as a day support function. This is based on the maintenance concept of using vendor labor for COTS HW maintenance. On-shift personnel will be provided with procedures and call lists to work-around and coordinate HW failures.
DAAC Science SW I&T Support Engineer	DID 608 (Jul-95) staffing: Algorithm Technical Support Engr, 3.0, Jan-98 through Oct-02. Algorithm I&T Support Engr, 0.0. DID 608 (Jan-98) staffing: 1.0, Oct-96 through Oct-02. See Section L for a thorough discussion of the estimation model.
DAAC User Services Representative	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Jun-98; 4.0, Jul-98 through Sep-98; 6.0, Jan-00 through Oct-02. Appendix L discusses the general staffing model for User Services Representative.
DAAC Science Data Specialist	DID 608 (Jul-95) staffing: 3.0, Jan-98 through Jun-98; 7.0, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 2.0, Jan-98 through Oct-02. The DID 608 (Jan-98) staffing is based on 1 staff member for MODIS and 1 for DAO.
DAAC Operations Supervisor	DID 608 (Jul-95) staffing: 0.5, Jan-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Oct-02. DID 608 (Jan-98) staffing position was raised to 1 MM/M to reflect the scope and complexity of operations at the DAAC.
DAAC Production Planner	DID 608 (Jul-95) staffing: 0.5, Jan-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Oct-02. DID 608 (Jan-98) staffing starts the production planner earlier to improve support to acceptance testing and operations transition for Release B.
DAAC Production Monitor	DID 608 (Jul-95) staffing: 4.8, Jan-98 through Jun-98; 6.7, Jul-98 through Sep-98; 10.4, Oct-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Mar-98; 4.7, Apr-98 through Oct-02. This staffing is based on 1 person per shift to monitor MODIS processing. This staffing profile is based on the level of automation and quality of the monitoring tools available to this function. It is further substantiated by experience at the University of Miami with Autosys in which monitoring of processing is a part time job by one of the staff members.

Table C-2. Justification for GSFC Staffing Changes (2 of 3)

Position	Summary Basis of Estimate/Rationale
DAAC Resource Manager DID 608 (Jul-95) staffing assumed TRMM is in the baseline. DID 608 (xx) assumes TRMM is removed.	DID 608 (xx) staffing: 1.0, Jan-98 through Jun-98; 5.7, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Mar-97; 4.7, Apr-98 through Oct-02. The DID 608 (Jan-98) staffing approach provides 1 person per operational shift and eliminates the additional day shift position contained in the DID 608 (Jul-95) plan. The DID 608 (Jan-98) shift coverage begins at AM-1 L-3 Mo. This reduction is justified by the level of monitoring and life cycle services being provided by the MSS COTS and custom SW components.
DAAC Archive Manager	DID 608 (Jul-95) staffing: 2.8, Jan-98 through Jun-98; 6.7, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Oct-02. The DID 608 (Jan-98) staffing approach provides 1 person per day to monitor trends, plan long-term strategies, etc., for use of the archive. The DID 608 (Jul-95) approach had staff members on each operational shift, backed up by additional staff on weekday day shifts. This reduction is justified by the level of automation and monitoring and life cycle services being provided by the data server and MSS COTS and custom SW components. Further, the NCAR facility in Boulder, CO, runs similar robotic archives and has not found a need for on-shift monitoring by a dedicated staff member.
DAAC Ingest/Distribution Tech.	DID 608 (Jul-95) staffing: 6.0, Jan-98 through Sep-98; 8.0 Oct-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Mar-98; 4.7, Apr-98 through Oct-02. See Section L for a thorough discussion of the estimation model.
DAAC V0 Data Migration Operator	DID 608 (Jul-95) staffing: 0.0. DID 608 (Jan-98) staffing: 3.1, Jun-99 through Dec-00. The DID 608 (Jan-98) staffing is consistent with the effort included in WBS 8 by Change Order 1. Labor was allocated to the DAACs to cover the periods of V0 data migration as described in the “Proposed ECS Plan for V0 Data Migration (Operations Phase)”, 12-Aug-96. The staff at each DAAC was based on the volume of data to be migrated: • ASF: 0.1 TB • EDC: 13.0 TB • GSFC: 10.0 TB • JPL: 2.0 TB • LaRC: 3.0 TB • NSIDC: 0.1 TB Staffing was replanned to assume the effort will start in Jan-1999.

Table C-2. Justification for GSFC Staffing Changes (3 of 3)

Position	Summary Basis of Estimate/Rationale
DAAC Computer Operator & DAAC System Administrator	DID 608 (Jul-95) staffing: 5.8, Jan-98 through Jun-98; 6.7, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 3.0, Jan-98 through Mar-98; 5.7, Apr-98 through Oct-02. System Administrator positions in the DID 608 (Jan-98) staffing approach is based on 1 SA for every 25 computers (including the office environment). In addition the DID 608 (Jan-98) staffing approach adds a computer operator to support the on-shift Resource Manager, Production Monitors, and Ingest/Distribution Technician and to perform system backup and other administrative tasks. This around the clock staffing starts at 3 months prior to AM-1 launch.

This page intentionally left blank.

Appendix D. JPL DAAC Staffing Plan

Staffing levels for ECS maintenance and operations at the JPL DAAC are shown in Table D-1. DAAC activation has been changed in accordance with Change Order 53 which moved the delivery of the JPL DAAC from 1997 to 1998. Hours of operations were adjusted by Change Order 52.

Changes between this plan and the Jul-95 plan are summarized in Table D-2. Additional staffing model information is contained in Appendix L.

Based on CCR 505-01-41-157A, the ECS Contractor's scope at JPL is shown in Table D-3.

Table D-1. JPL DAAC ECS Maintenance and Operations Staffing Plan (Headcount) (1 of 2)

JPL_608_Jan_98_1 Function	Jan-98	Jun-98	ADEOS-2 L-6 mo Sep-98	ADEOS-2 L-3 MO Dec-98	JASON Launch Apr-99	Mar-00
DAAC ECS Contr. Mgr & DAAC AA		0.5	0.5	0.5	0.5	0.5
DAAC Ops Readiness & Perf. Assur.		0.5	0.5	0.5		
DAAC Engineering/Science Liaison	1.0					
DAAC System Engineer		0.5	0.5	1.5	1.5	1.5
DAAC SW Maintenance Engineer		1.0	1.0	1.0	1.0	1.0
DAAC System Test Engineer				0.5	0.5	0.5
DAAC Database Administrator		1.0	1.0	1.0	1.0	1.0
DAAC Resource Planner				0.5	1.0	1.0
DAAC CM Administrator				0.5	0.5	0.5
DAAC ILS Administrator		0.5	0.5	0.5	0.5	0.5
DAAC Maintenance Coordinator		0.5	0.5	0.5	0.5	0.5
DAAC Science SW I&T Support Engr.			1.5	1.5	1.5	0.5
DAAC Science Coordinator						
DAAC User Services Representative		1.0	1.0	1.0	1.0	1.0
DAAC Science Data Specialist		2.0	2.0	2.0	2.0	2.0
DAAC Operations Supervisor		1.0	1.0	1.0	1.0	1.0
DAAC Production Planner		0.1	0.1	0.3	0.3	0.3
DAAC Production Monitor		0.1	0.1	0.2	0.2	0.2
DAAC Resource Manager		0.1	0.1	0.3	0.3	0.3
DAAC Archive Manager		1.0	1.0	1.0	1.0	1.0
DAAC Ingest/Distribution Tech.		0.2	0.2	0.2	0.2	0.2
DAAC V0 Data Migration						
DAAC Computer Operator						
DAAC System Administrator		1.0	1.0	1.0	1.0	1.0
Total MM = 772.0 MM	1.0	11.0	12.5	15.5	15.5	14.5

Table D-1. JPL DAAC ECS Maintenance and Operations Staffing Plan (Headcount) (2 of 2)

JPL_608_Jan_98_1 Function	End of Contract Nov-02					
DAAC ECS Contr. Mgr & DAAC AA DAAC Ops Readiness & Perf. Assur. DAAC Engineering/Science Liaison						
DAAC System Engineer DAAC SW Maintenance Engineer DAAC System Test Engineer						
DAAC Database Administrator DAAC Resource Planner DAAC CM Administrator						
DAAC ILS Administrator DAAC Maintenance Coordinator DAAC Science SW I&T Support Engr.						
DAAC Science Coordinator DAAC User Services Representative DAAC Science Data Specialist						
DAAC Operations Supervisor DAAC Production Planner DAAC Production Monitor						
DAAC Resource Manager DAAC Archive Manager DAAC Ingest/Distribution Tech.						
DAAC V0 Data Migration DAAC Computer Operator DAAC System Administrator						
Total MM = 772.0 MM						

Table D-2. Justification for JPL Staffing Changes (1 of 2)

Position	Summary Basis of Estimate/Rationale
DAAC Assistance Engineer/DAAC Engineering/ Science Liaison	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through May-98. DID 608 (Jul-95) included this position included as a place holder against eventual transition of M&O responsibilities from the ECS Contractor to the JPL DAAC. This transition is not covered by this analysis and has been deleted in the DID 608 (Jan-98) staffing. The DAAC Engineering/Science Liaison position has been extended until the first CSR at JPL, currently scheduled for Jun-98.
DAAC Ops Readiness & Performance Assurance	DID 608 (Jul-95) staffing: 0.5, Jan-98 through Oct-02. DID 608 (Jan-98) staffing: 0.5, Jun-98 through Mar-99; 0.0 Apr-99 through Oct-02. DID 608 (Jul-95) staffing should have ended with the last launch, rather than be carried through the end of the contract. Also, see the justification for the DAAC Production Planner for a discussion on how this and other functions are performed by a single individual.
DAAC System Engineer	DID 608 (Jul-95) staffing: 0.5, Jan-98 through Jun-98; 1.5, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 0.5, Jan-98 through Nov-98; 1.5, Dec-98 through Oct-02. DID 608 (Jan-98) assumes an increased staffing need prior to the ADEOS-2 launch, rather than at the AM-1 launch date since JPL is not involved in the AM-1 launch.
DAAC System Test Engineer	DID 608 (Jul-95) staffing: 0.5, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 0.5, Dec-98 through Oct-02. DID 608 (Jan-98) assumes an increased staffing need prior to the ADEOS-2 launch, rather than at the AM-1 launch date since JPL is not involved in the AM-1 launch.
DAAC Resource Planner	DID 608 (Jul-95) staffing: 0.5, Jun-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Dec-98 through Oct-02. DID 608 (Jan-98) assumes an increased staffing need prior to the ADEOS-2 launch. The function will be performed by the other members of the engineering staff prior to that time.
DAAC CM Administrator	DID 608 (Jul-95) staffing: 0.5, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 0.5, Dec-98 through Mar-99; 1.0, Apr-99 through Oct-02. DID 608 (Jan-98) assumes an increased staffing need prior to the ADEOS-2 launch, rather than at the AM-1 launch date since JPL is not involved in the AM-1 launch.

Table D-2. Justification for JPL Staffing Changes (2 of 2)

Position	Summary Basis of Estimate/Rationale
DAAC Science SW I&T Support Engineer	DID 608 (Jul-95) staffing: Algorithm Technical Support Engr, 1.0, Sep-98 through Oct-02. Algorithm I&T Support Engr, 1.0, Sep-98 through Oct-02. DID 608 (Jan-98) staffing: 1.5, Sep-98 through Oct-02. See Section L for a thorough discussion of the estimation model.
DAAC User Services Representative	DID 608 (Jul-95) staffing: 0.0. DID 608 (Jan-98) staffing: 1.0, Jun-98 through Oct-02. Appendix L discusses the general staffing model for User Services Representative.
DAAC Operations Supervisor	DID 608 (Jul-95) staffing: 0.1, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Oct-02. DID 608 (Jan-98) staffing starts the supervisor earlier to improve support to acceptance testing and operations transition for Release B.
DAAC Production Planner	DID 608 (Jul-95) staffing: 0.2, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 0.1, Jun-98 through Nov-98; 0.3 Dec-98 through Oct-02. In the DID 608 (Jan-98) staffing plan, performance of the DAAC Production Monitor's functions are performed by the same individual who performs the DAAC Production Monitor's functions, the DAAC Resource Manager's functions, and the DAAC Ingest/Distribution Tech's functions. The total staffing requirement is 1 MM/M. The earlier start for this position is to improve support to acceptance testing and operations transition for Release B.
DAAC Production Monitor	DID 608 (Jul-95) staffing: 0.0 throughout period. DID 608 (Jan-98) staffing: 0.1, Jun-98 through Nov-98; 0.2 Dec-98 through Oct-02. See DAAC Production Planner.
DAAC Resource Manager	DID 608 (Jul-95) staffing: 0.7 Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 0.1, Jun-98 through Nov-98; 0.3 Dec-98 through Oct-02. See DAAC Production Planner.
DAAC Ingest/Distribution Technician	DID 608 (Jul-95) staffing: 0.0 throughout period.. DID 608 (Jan-98) staffing: 0.1, Jun-98 through Nov-98; 0.2 Dec-98 through Oct-02. See DAAC Production Planner.

Table D-3. JPL DAAC ECS Maintenance and Operations Staffing Plan - ECS Scope - (Headcount)

JPL_608_Jan_98_2 Function	Jan-98	Jun-98	End of Contract Nov-02			
DAAC ECS Contr. Mgr & DAAC AA DAAC Ops Readiness & Perf. Assur. DAAC Engineering/Science Liaison	1.0					
DAAC System Engineer DAAC SW Maintenance Engineer DAAC System Test Engineer		1.0 1.0				
DAAC Database Administrator DAAC Resource Planner DAAC CM Administrator						
DAAC ILS Administrator DAAC Maintenance Coordinator DAAC Science SW I&T Support Engr.						
DAAC Science Coordinator DAAC User Services Representative DAAC Science Data Specialist						
DAAC Operations Supervisor DAAC Production Planner DAAC Production Monitor						
DAAC Resource Manager DAAC Archive Manager DAAC Ingest/Distribution Tech.						
DAAC V0 Data Migration DAAC Computer Operator DAAC System Administrator						
Total MM = 111.0 MM	1.0	2.0				

This page intentionally left blank.

Appendix E. LaRC DAAC Staffing Plan

Staffing levels for ECS maintenance and operations at the LaRC DAAC are shown in Tables E-1 and E-3. This staffing assumes that TRMM/CERES processing has been removed from the baseline in accordance with Change Order 53. Data volumes for TRMM/CERES for staffing purposes have not been removed, however.

Changes between this plan and the Jul-95 plan are summarized in Table E-2. Additional staffing model information is contained in Appendix L.

Based on CCR 505-01-41-107, LaRC Research Center (LaRC) M&O Transition, Staff Consolidation (Contract Modification 52, Topic 3), Table E-3 shows the ECS Contract funded staffing.

Table E-1. LaRC DAAC ECS Maintenance and Operations Staffing Plan (Headcount) (1 of 2)

LaRC_608_Jan_98_1 Function	AM-1 L-6 mo Jan-98	AM-1 L-3 mo Apr-98	AM-1 Launch Jul-98	Jan-99	Apr-99	AM-1 L+12 mo Jul-99
DAAC ECS Contr. Mgr & DAAC AA	2.0	2.0	2.0	2.0	2.0	2.0
DAAC Ops Readiness & Perf. Assur.	0.5	0.5				
DAAC Engineering/Science Liaison						
DAAC System Engineer	5.0	5.0	5.0	5.0	5.0	5.0
DAAC SW Maintenance Engineer	3.0	3.0	3.0	3.0	3.0	3.0
DAAC System Test Engineer	2.0	2.0	2.0	2.0	2.0	2.0
DAAC Database Administrator	3.0	3.0	3.0	3.0	3.0	3.0
DAAC Resource Planner	0.5	0.5	1.0	1.0	1.0	1.0
DAAC CM Administrator	1.0	1.0	1.0	1.0	1.0	1.0
DAAC ILS Administrator	1.0	1.0	1.0	1.0	1.0	1.0
DAAC Maintenance Coordinator	1.0	1.0	1.0	1.0	1.0	1.0
DAAC Science SW I&T Support Engr.	5.0	5.0	4.5	4.5	4.5	2.5
DAAC Science Coordinator	1.0	1.0	1.0	1.0	1.0	1.0
DAAC User Services Representative	1.0	1.0	1.0	1.0	2.0	2.0
DAAC Science Data Specialist	1.0	3.0	3.0	3.0	3.0	3.0
DAAC Operations Supervisor	1.0	1.0	1.0	1.0	1.0	1.0
DAAC Production Planner	1.0	1.0	1.0	1.0	1.0	1.0
DAAC Production Monitor	2.0	9.4	9.4	9.4	9.4	9.4
DAAC Resource Manager	1.0	4.7	4.7	4.7	4.7	4.7
DAAC Archive Manager	1.0	1.0	1.0	1.0	1.0	1.0
DAAC Ingest/Distribution Tech.	1.0	4.7	4.7	4.7	4.7	4.7
DAAC V0 Data Migration				1.5	1.5	1.5
DAAC Computer Operator	1.0	3.7	3.7	3.7	3.7	3.7
DAAC System Administrator	2.0	2.0	2.0	2.0	2.0	2.0
Total MM = 3191.5 MM	37.0	56.5	56.0	57.5	58.5	56.5

Table E-1. LaRC DAAC ECS Maintenance and Operations Staffing Plan (Headcount) (2 of 2)

LaRC_608_Jan_98_1 Function	Jan-01	End of Contract Nov-02				
DAAC ECS Contr. Mgr & DAAC AA DAAC Ops Readiness & Perf. Assur. DAAC Engineering/Science Liaison	2.0					
DAAC System Engineer DAAC SW Maintenance Engineer DAAC System Test Engineer	5.0 3.0 2.0					
DAAC Database Administrator DAAC Resource Planner DAAC CM Administrator	3.0 1.0 1.0					
DAAC ILS Administrator DAAC Maintenance Coordinator DAAC Science SW I&T Support Engr.	1.0 1.0 2.5					
DAAC Science Coordinator DAAC User Services Representative DAAC Science Data Specialist	1.0 2.0 3.0					
DAAC Operations Supervisor DAAC Production Planner DAAC Production Monitor	1.0 1.0 9.4					
DAAC Resource Manager DAAC Archive Manager DAAC Ingest/Distribution Tech.	4.7 1.0 4.7					
DAAC V0 Data Migration DAAC Computer Operator DAAC System Administrator	 3.7 2.0					
Total MM = 3191.5 MM	55.0					

Table E-2. Justification for LaRC Staffing Changes (1 of 3)

Position	Summary Basis of Estimate/Rationale
DAAC Assistance Engineer	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Feb-98; 2.0, Mar-98 through Oct-02. DID 608 (Jan-98) staffing: 0.0 throughout period. DID 608 (Jul-95) included this position included as a place holder against eventual transition of M&O responsibilities from the ECS Contractor to the EDC DAAC. This transition is not covered by this analysis and has been deleted in the DID 608 (Jan-98) staffing
DAAC Maintenance Coordinator	DID 608 (Jul-95) staffing: 3.0, Jan-98 through Sep-98; 7.7, Oct-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0 Jan-98 through Oct-02. The significant change is not putting the position onto each operational shift but, rather, having the position as a day support function. This is based on the maintenance concept of using vendor labor for COTS HW maintenance. On-shift personnel will be provided with procedures and call lists to work-around and coordinate HW failures.
DAAC Science SW I&T Support Engineer	DID 608 (Jul-95) staffing: Algorithm Technical Support Engr, 1.0, Jan-98 through Oct-02. Algorithm I&T Support Engr, 6.0, Jan-98 through Oct-02. DID 608 (Jan-98) staffing: 5.0, Jan-98 through Jun-98; 4.5, Jul-98 through Jun-99, 2.5, Jul-99 through Oct-02. See Section L for a thorough discussion of the estimation model.
DAAC User Services Representative	DID 608 (Jul-95) staffing: 1.0 throughout the period. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Mar-99; 2.0, Apr-99 through Oct-02. Appendix L discusses the general staffing model for User Services Representative.
DAAC Science Data Specialist	DID 608 (Jul-95) staffing: 3.0, Jan-98 through Jun-98; 7.0, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Mar-98, 3.0, Apr-98 through Oct-02. The DID 608 (Jan-98) staffing is based on the missions shown in Table 5-1. One position is allocated as follows: 1 for AM-1/CERES, 1 for AM-1/MISR, 1 for AM-1/MOPITT and METEOR/SAGE III.
DAAC Operations Supervisor	DID 608 (Jul-95) staffing: 0.3, Jan-98 through Jun-98; 0.5, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Oct-02. DID 608 (Jan-98) has the staffing at a higher level to improve the performance of the operations team via increased management attention.
DAAC Production Planner	DID 608 (Jul-95) staffing: 0.3, Jan-98 through Jun-98, 0.5, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Oct-02. DID 608 (Jan-98) has increased the staffing to provide improved planning services.

Table E-2. Justification for LaRC Staffing Changes (2 of 3)

Position	Summary Basis of Estimate/Rationale
DAAC Production Monitor DID 608 (Jul-95) staffing assumed TRMM is in the baseline. DID 608 (xx) assumes TRMM is removed.	DID 608 (xx) staffing: 1.0, Jan-98 through Feb-98; 9.4, Apr-98 through Jun-98; 9.4, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 2.0, Jan-98 through Mar-98; 9.4, Apr-98 through Oct-02. This staffing is increased by 1.0 MM/Mo prior to AM-1 L-3 Mos to support pre-launch activities.
DAAC Resource Manager DID 608 (Jul-95) staffing assumed TRMM is in the baseline. DID 608 (xx) assumes TRMM is removed.	DID 608 (xx) staffing: 1.0, Jan-98 through Jun-98; 5.7 Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Mar-98; 4.7, Apr-98 through Oct-02. DID 608 (Jan-98) reduces the operations staffing by 1.0 MM/Mo following AM-1 launch. This reduction is justified by the level of monitoring and life cycle services being provided by the MSS COTS and custom SW components.
DAAC Archive Manager DID 608 (Jul-95) staffing assumed TRMM is in the baseline. DID 608 (xx) assumes TRMM is removed.	DID 608 (Jul-95) staffing: 2.8, Jan-98 through Jun-98; 6.7, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Oct-02. The DID 608 (Jan-98) staffing approach provides 1 person per day to monitor trends, plan long-term strategies, etc., for use of the archive. The DID 608 (Jul-95) approach had staff members on each operational shift, backed up by additional staff on weekday day shifts. This reduction is justified by the level of automation and monitoring and life cycle services being provided by the data server and MSS COTS and custom SW components. Further, the NCAR facility in Boulder, CO, runs similar robotic archives and has not found a need for on-shift monitoring by a dedicated staff member.
DAAC Ingest/Distribution Technician DID 608 (Jul-95) staffing assumed TRMM is in the baseline. DID 608 (xx) assumes TRMM is removed.	DID 608 (xx) staffing: 1.0, Jan-98 through Mar-98; 3.0, Apr-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jun-98 through Apr-98; 4.7, Apr-98 through Oct-02. See Section L for a thorough discussion of the estimation model.

Table E-2. Justification for LaRC Staffing Changes (3 of 3)

Position	Summary Basis of Estimate/Rationale
DAAC Computer Operator/DAAC System Administrator DID 608 (Jul-95) staffing assumed TRMM is in the baseline. DID 608 (xx) assumes TRMM is removed.	DID 608 (xx) staffing: 1.0, Jan-98 through Jun-98; 4.7, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 3.0, Jan-98 through Mar-98; 5.7, Apr-98 through Oct-02. DID 608 (Jan-98) staffing implements 7 days/week, 24 hours/day by adding a computer operator who is trained to deal with HW and SW failures/aborts, and/or to call for assistance from the day staff or SMC as needed. This around the clock staffing starts at 3 months prior to AM-1 launch.

Table E-3. LaRC DAAC ECS Maintenance and Operations Staffing Plan - ECS Scope - (Headcount)

LaRC_608_Jan_98_2 Function	Jan-98	Jan-99	End of Contract Nov-02			
DAAC ECS Contr. Mgr & DAAC AA	0.5	0.5				
DAAC System Engineer	2.5	2.5				
DAAC SW Maintenance Engineer	3.0	2.0				
DAAC System Test Engineer	1.0	1.0				
Total MM = 360.0 MM	7.0	6.0				

Appendix F. Deleted

This page intentionally left blank.

Appendix G. NSIDC DAAC Staffing Plan

Staffing levels for ECS maintenance and operations at the NSIDC DAAC are shown in Table G-1. Hours of operations were adjusted by Change Order 52.

Changes between this plan and the Jul-95 plan are summarized in Table G-2. Additional staffing model information is contained in Appendix L.

Based on CCR 505-01-41-150C, Consolidate Snow and Ice DAAC Operations Staff (Contract Modification 61, Topic 1), Table G-3 shows the ECS Contract funded staffing.

Table G-1. NSIDC DAAC ECS Maintenance and Operations Staffing Plan (Headcount)

NSIDC_608_Jan_98_1 Function	Jan-98	AM1 L-3 Mo. Apr-98	AM1 Launch Jul-98	End of Contract Nov-02		
DAAC ECS Contr. Mgr & DAAC AA	0.5	0.5	0.5			
DAAC Ops Readiness & Perf. Assur.	0.5	0.5				
DAAC Engineering/Science Liaison						
DAAC System Engineer	1.5	1.5	1.5			
DAAC SW Maintenance Engineer	1.0	1.0	1.0			
DAAC System Test Engineer	0.5	0.5	0.5			
DAAC Database Administrator	1.0	1.0	1.0			
DAAC Resource Planner	0.5	0.5	1.0			
DAAC CM Administrator	0.5	0.5	0.5			
DAAC ILS Administrator	0.5	0.5	0.5			
DAAC Maintenance Coordinator	0.5	0.5	0.5			
DAAC Science SW I&T Support Engr.	0.5	0.5	0.5			
DAAC Science Coordinator						
DAAC User Services Representative	1.0	1.0	1.0			
DAAC Science Data Specialist	1.0	1.0	1.0			
DAAC Operations Supervisor	0.1	0.1	0.3			
DAAC Production Planner	0.2	0.2	0.3			
DAAC Production Monitor	1.0	1.6	1.6			
DAAC Resource Manager	0.7	1.6	1.6			
DAAC Archive Manager	1.0	1.0	1.0			
DAAC Ingest/Distribution Tech.						
DAAC V0 Data Migration						
DAAC Computer Operator		1.0	1.0			
DAAC System Administrator	1.0	1.0	1.0			
Total MM = 936.1 MM	13.5	16.0	16.3			

Table G-2. Justification for NSIDC Staffing Changes

Position	Summary Basis of Estimate/Rationale
DAAC Assistance Engineer	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Oct-02. DID 608 (Jan-98) staffing: 0.0 throughout period.
DAAC Science SW I&T Support Engr.	DID 608 (Jul-95) staffing: Algorithm Technical Support Engr, 0.0. Algorithm I&T Support Engr, 0.0. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Oct-02. See Section L for a thorough discussion of the estimation model.
DAAC User Services Representative	DID 608 (Jul-95) staffing: 0.0. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Oct-02. Appendix L discusses the general staffing model for User Services Representative.
DAAC Science Data Specialist	DID 608 (Jul-95) staffing: 2.0, Jan-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Oct-02. DID 608 (Jul-95) started staffing at Release B RRR plus 1 month. DID 608 (Jan-98) staffing starts staffing at the DAAC at RRR. Staffing is based on the combined number of Instrument Teams or data sets shown in Table 5-1. This approach was consistently applied at all DAACs.
DAAC Production Monitor	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0 Jan-98 through Mar-98; 1.6, Apr-98 through Oct-02. The Release B design for NSIDC has adequate processing and storage resources for MODIS production to be accomplished in 7 days/week, 8 hours/day. Therefore, this position goes onto that schedule at AM-1 Launch - 3 months.
DAAC Resource Manager	DID 608 (Jul-95) staffing: 0.7, Jan-98 through Jun-98; 1.0, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Mar-98; 1.6, Apr-98 through Oct-02. See Production Monitor.
DAAC Archive Manager	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Jun-98; 1.2, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Oct-02. The DID 608 (Jan-98) staffing approach provides 1 person per day to monitor trends, plan long-term strategies, etc., for use of the archive. The DID 608 (Jul-95) approach had staff members on operational shifts. This reduction is justified by the level of automation and monitoring and life cycle services being provided by the data server and MSS COTS and custom SW components. Further, the NCAR facility in Boulder, CO, runs similar robotic archives and has not found a need for on-shift monitoring.

Table G-2. Justification for NSIDC Staffing Changes (Continued)

Position	Summary Basis of Estimate/Rationale
DAAC Computer Operator/DAAC System Administrator	DID 608 (Jul-95) staffing: 1.0, Jul-97 through Jun-98; 1.2, Jul-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Oct-96 through Apr-97; 4.7 May-97 through Oct-02. DID 608 (Jan-98) staffing implements 7 days/week, 24 hours/day by adding a computer operator who is trained to deal with HW and SW failures/aborts, and/or to call for assistance from the day staff or SMC as needed. This around the clock staffing starts at 3 months prior to AM-1 launch

Table G-3. NSIDC DAAC ECS Maintenance and Operations Staffing Plan - ECS Scope - (Headcount)

NSIDC_608_Jan_98_2 Function	Jan-98	End of Contract Nov-02				
DAAC ECS Contr. Mgr & DAAC AA	0.5					
DAAC System Engineer	0.5					
DAAC SW Maintenance Engineer	1.0					
DAAC System Test Engineer	1.0					
DAAC ILS Administrator	0.5					
DAAC Maintenance Coordinator	0.5					
DAAC Science Coordinator	1.0					
DAAC System Administrator	1.0					
Total MM = 348.0 MM	6.0					

This page intentionally left blank.

Appendix H. ORNL DAAC Staffing Plan (ECS Contractor Functions Only)

Staffing levels for ECS maintenance and operations at the ORNL DAAC are shown in Table H-1. There are no changes between this plan and the Jul-95 plan.

The ECS Contractor will provide only a System Engineering liaison for the contract period of performance. Table H-2 shows the ECS Contractor staffing profile at the ORNL DAAC.

Table H-1. ORNL DAAC ECS Maintenance and Operations Staffing Plan (Headcount)

ORNL_608_Jan_98_1 Function	 Jan-98	Rel B.1 RRR - 2 months Jul-98	Rel B.1 RRR Sep-98	End of Contract Nov-02		
DAAC ECS Contr. Mgr & DAAC AA		0.5	0.5			
DAAC Ops Readiness & Perf. Assur.						
DAAC Engineering/Science Liaison	1.0	1.0	1.0			
DAAC System Engineer		0.5	0.5			
DAAC SW Maintenance Engineer		0.6	0.6			
DAAC System Test Engineer		0.2	0.2			
DAAC Database Administrator		1.0	1.0			
DAAC Resource Planner						
DAAC CM Administrator		0.2	0.2			
DAAC ILS Administrator		0.5	0.5			
DAAC Maintenance Coordinator		0.5	0.5			
DAAC Science SW I&T Support Engr.						
DAAC Science Coordinator						
DAAC User Services Representative		1.0	1.0			
DAAC Science Data Specialist			1.0			
DAAC Operations Supervisor						
DAAC Production Planner						
DAAC Production Monitor						
DAAC Resource Manager			0.4			
DAAC Archive Manager			0.6			
DAAC Ingest/Distribution Tech.						
DAAC V0 Data Migration						
DAAC Computer Operator						
DAAC System Administrator		1.0	1.0			
Total MM = 470.0 MM	1.0	7.0	9.0			

Table H-2. ORNL DAAC ECS Maintenance and Operations Staffing Plan - ECS Scope - (Headcount)

ORNL_608_Jan_98_2 Function	 Jan-98	End of Contract Nov-02				
DAAC Engineering/Science Liaison	1.0					
Total MM = 58.0 MM	1.0					

Appendix I. SMC Staffing Plan

Staffing levels for ECS maintenance and operations at the SMC are shown in Table I-1.

Changes between this plan and the Jul-95 plan are summarized in Table I-2. Additional staffing model information is contained in Appendix L.

Table I-1. SMC ECS Maintenance and Operations Staffing Plan (Headcount)

SMC_608_Jan_98 Function	Rel B.0 RRR Jan-98	AM-1 L-3 Mo. Apr-98	Rel B.1 CSR Jul-98	Rel B.1 RRR Sep-98	End of Contract Nov-02	
SMC Operations Supervisor	0.5	0.5	0.5	0.5		
SMC System Administrator	3.0	3.0	3.0	3.0		
SMC Performance Analyst	0.5	2.0	2.0	2.0		
SMC Network Analyst	1.0	2.0	2.0	2.0		
SMC CM Administrator	1.0	1.0	1.0	1.0		
SMC Billing Clerk			1.0	3.0		
SMC Accountant			1.0	1.0		
SMC Security Controller	1.0	2.0	2.0	2.0		
SMC Resource Controller	1.0	4.7	4.7	4.7		
SMC Fault Manager	1.0	4.7	4.7	4.7		
Total MM = 1325.5 MM	9.0	19.9	21.9	23.9		

Table I-2. Justification for SMC Staffing Changes (1 of 2)

Position	Summary Basis of Estimate/Rationale
SMC/EOC System Administrator/ SMC/EOC Computer Operator DID 608 (Jul-95) staffing assumed TRMM is in the baseline. DID 608 (xx) assumes TRMM is removed.	DID 608 (xx) staffing: 1.0, Jan-98 through Mar-98; 4.7, Apr-98 through Oct-02. DID 608 (Jan-98) staffing: 0.0 throughout the period. This position has been moved to the EOC.
SMC Network Analyst	DID 608 (Jul-95) staffing: 1.2, Jan-98 through Mar-98; 3.0, Apr-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Oct-02. This position was reduced as part of the EBNET change proposal.

Table I-2. Justification for SMC Staffing Changes (2 of 2)

Position	Summary Basis of Estimate/Rationale
SMC/EOC Maintenance Coordinator	DID 608 (Jul-95) staffing (from SEO): 1.0 Oct-96 through Dec-97; 3.0, Jan-98 through Mar-98; 4.7, Apr-98 through Oct-02. DID 608 (Jan-98) staffing: 0.0 throughout the period. This position has been moved to the EOC section.
SMC Accountant	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jul-98 through Oct-02. Initial staffing in the position was delayed in accordance with Mod 53.
SMC Billing Clerk	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Mar-98; 3.0, Apr-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jul-98 through Aug-98; 3.0 Sep-98 through Oct-02. Initial staffing the position was delayed in accordance with Mod 53.
SMC Security Controller	DID 608 (Jul-95) staffing: 1.0 Jan-98 through Mar-98; 4.7, Apr-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Mar-98; 2.0, Apr-98 through Oct-02. The primary function of the SMC security controllers will be to review logs, monitor security alerts, notify DAACs of security alerts, etc. Primary security monitoring and control will be the responsibility of DAAC personnel. Based on this revised operations concept, this position was reduced from an every shift position to a day shift only position based on the security architecture and design.
SMC Resource Controller	DID 608 (Jul-95) staffing: 4.3, Apr-98 through Dec-00; 4.8, Jan-01 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Mar-98; 4.7, Apr-98 through Oct-02. Operations staffing for TRMM was deleted by Mod 53.
SMC Fault Manager	DID 608 (Jul-95) staffing: 4.7, Jan-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Mar-98; 4.7, Apr-98 through Oct-02. Operations staffing for TRMM was deleted by Mod 53.
SMC Network Configuration Manager	DID 608 (Jul-95) staffing: 4.7, Jan-98 through Oct-02. DID 608 (Jan-98) staffing: 0.0 The position was deleted by Mod 30.
SMC Network Help Desk	DID 608 (Jul-95) staffing: 2.0, Jan-98 through Mar-98; 5.7, Apr-98 through Oct-02. DID 608 (Jan-98) staffing: 0.0 The position was deleted by Mod 30.

Appendix J. EOC Staffing Plan

The functional positions and staffing for management, system engineering, maintenance and operations functions are shown in Table J-1.

Table J-1. EOC Maintenance and Operations Staffing Plan (Headcount)

EOC_608_Jan_98 Function	Jan-98	AM-1 L-2 Mo Apr-98	AM-1 L+11 Mo May-99	End Of Contract Nov-02		
Project Support Manager	1.0	1.0	1.0			
Configuration Management Coordinator	1.0	1.0	1.0			
Performance Assurance Coordinator	0.5	0.5	0.5			
Training Coordinator	1.0	1.0	1.0			
Administrative Assistant	1.0	1.0	1.0			
Operations Manager	1.0	1.0	1.0			
Operations Coord	1.0	1.0	1.0			
Ops Control Sup (Shift)	4.0	4.0	4.0			
S/C Activity Cntrl (Shift)	2.0	2.0	1.0			
Mission Planner / Sup	1.0	1.0	1.0			
Scheduler	3.0	3.0	2.0			
Flight Sys Eng	1.0	1.0	1.0			
Off-Line Eng	5.0	5.0	5.0			
Evaluator (Shift)	8.0	8.0	8.0			
Grnd Sys Eng	1.0	1.0	1.0			
DBA / Sim Specialist	1.0	1.0	1.0			
Automation Spec.	1.0	1.0	1.0			
EOC/SMC Sys Admin	1.0	1.0	1.0			
EOC/SMC Comp Op / Sys Admin (Shift)		4.7	4.7			
EOC/SMC Maintenance Coordinator	1.0	4.7	4.7			
Total MM = 2437.0 MM	35.5	43.9	41.9			

[3] Hardware maintenance functions are provided by the SEO & ILS staff.

Table J-2. Justification for EOC Staffing Changes

Position	Summary Basis of Estimate/Rationale
EOC/SMC Computer Operator/System Admin. DID 608 (Jul-95) staffing assumed TRMM is in the baseline. DID 608 (xx) assumes TRMM is removed.	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Mar-98; 4.7, Apr-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Mar-98; 4.7, Apr-98 through Oct-02. The positions were moved from the SMC to the EOC to better reflect the support required by the EOC. The positions will continue to support the SMC.
EOC/SMC Maintenance Coordinator DID 608 (Jul-95) staffing assumed TRMM is in the baseline. DID 608 (xx) assumes TRMM is removed.	DID 608 (Jul-95) staffing: 1.0, Jan-98 through Mar-98; 4.7, Apr-98 through Oct-02. DID 608 (Jan-98) staffing: 1.0, Jan-98 through Mar-98; 4.7, Apr-98 through Oct-02. The positions were moved from the SEO staffing (where it was named “ILS HW Maintainer”) to the EOC to better reflect the support required by the EOC. The positions will support the SMC also and be on call to support the GDAAC if necessary and on a prioritized basis.

Appendix K. M&O Management, Sustaining Engineering Organization and System Integrated Logistics Support (SEO & ILS) Organization Staffing

Staffing levels for ECS Contractors in ECS Office Management, Sustaining Engineering and ILS organizations are shown in Tables K-1 through K-4.

Changes between these plans and the Jul-95 plan are summarized in Tables K-5 through K-7. Additional staffing model information is contained in Appendix L. There is no change in the M&O Management staffing plan.

Table K-1. M&O Management Staffing Plan (Headcount)

MO_Mgt_ILS_608_Jan_98 Function	Jan-98	End of Contract Nov-02				
ECS Managers & AAs	6.0					
Total MM = 58.0 MM	6.0					

Table K-2. SEO Sustaining Engineering Staffing Plan (Headcount) (Before Change Orders)

SEO_608_Jan_98_1 Function	Jan-98	Apr-98	Oct-99	Jan-01	End of Contract Nov-02	
SEO Manager and Admin. Asst.	2.0	2.0	2.0	2.0		
SEO Ops Readiness & Perf. Assur.	1.0	1.0	1.0	1.0		
SEO ECS Operations Trainer	5.0	3.0	3.0	3.0		
SEO System Engineer	7.0	7.0	7.0	7.0		
SEO SW Maintenance Engineer	15.0	15.0	12.0	10.0		
SEO System Test Engineer	4.0	4.0	4.0	4.0		
SEO CM Administrator	7.0	7.0	7.0	7.0		
SEO Science Coordinator	1.0	1.0	1.0	1.0		
SEO Librarian	1.0	1.0	1.0	1.0		
Total MM = 2229.0 MM	43.0	41.0	38.0	36.0		

Table K-3. SEO Sustaining Engineering Contractor Staffing Plan (Headcount) (Change Order Deltas) (1 of 2)

SEO_608_Jan_98_2 Function	Jan-98	Jul-98	Sep-98	Nov-99	Dec-99	Sep-01
Mod 53, LaRC Impact:						
8.4.1.2 a. SEO System Engineer						
8.4.1.2 b. SEO System Administrator				2.0		2.0
8.4.1.2 c. SEO CM Administrator				1.0		1.0
8.4.1.2 d. SEO System Test Engineer				2.0		2.0
8.4.1.2 e. SEO SW Maintenance Engineer	1.0	1.0	1.0	1.0	1.0	1.0
8.4.1.2 F. SEO SW Maintenance Engineer	1.0	1.0	1.0	1.0	1.0	1.0
Mod 61, NSIDC Impact:						
8.4.1.2 a. SEO System Engineer	0.3	0.3	0.3	0.3	0.3	0.3
8.4.1.2 b. SEO SW Maintenance Engineer	1.0	1.0	1.0	1.0	1.0	1.0
8.4.1.2 c. SEO System Test Engineer	0.2	0.2	0.2	0.2	0.2	0.2
8.4.1.2 d. SEO CM Administrator	0.3	0.3	0.3	0.3	0.3	0.3
8.4.1.2 d. SEO System Test Engineer		2.0		2.0		2.0
8.4.1.2 c. SEO CM Administrator		1.0		1.0		1.0
8.4.1.2 b. SEO System Administrator		2.0		2.0		2.0
Mod 61, JPL Impact:						
8.4.1.2 a. SEO System Engineer			0.3	0.3	0.3	0.3
8.4.1.2 b. SEO SW Maintenance Engineer			1.0	1.0	1.0	1.0
8.4.1.2 c. SEO System Test Engineer			0.2	0.2	0.2	0.2
8.4.1.2 d. SEO CM Administrator			0.3	0.3	0.3	0.3
8.4.1.2 d. SEO System Test Engineer		2.0		2.0		2.0
8.4.1.2 c. SEO CM Administrator		1.0		1.0		1.0
8.4.1.2 b. SEO System Administrator		2.0		2.0		2.0
Total MM = 360.4 MM	3.8	13.8	5.6	20.6	5.6	20.6

Table K-3. SEO Sustaining Engineering Contractor Staffing Plan (Headcount) (Change Order Deltas) (2 of 2)

SEO_608_Jan_98_2 Function	Oct-01	End of Contract Nov-02				
Mod 53, LaRC Impact:						
8.4.1.2 a. SEO System Engineer						
8.4.1.2 b. SEO System Administrator						
8.4.1.2 c. SEO CM Administrator						
8.4.1.2 d. SEO System Test Engineer						
8.4.1.2 e. SEO SW Maintenance Engineer	1.0					
8.4.1.2 F. SEO SW Maintenance Engineer	1.0					
Mod 61, NSIDC Impact:						
8.4.1.2 a. SEO System Engineer	0.3					
8.4.1.2 b. SEO SW Maintenance Engineer	1.0					
8.4.1.2 c. SEO System Test Engineer	0.2					
8.4.1.2 d. SEO CM Administrator	0.3					
8.4.1.2 d. SEO System Test Engineer						
8.4.1.2 c. SEO CM Administrator						
8.4.1.2 b. SEO System Administrator						
Mod 61, JPL Impact:						
8.4.1.2 a. SEO System Engineer	0.3					
8.4.1.2 b. SEO SW Maintenance Engineer	1.0					
8.4.1.2 c. SEO System Test Engineer	0.2					
8.4.1.2 d. SEO CM Administrator	0.3					
8.4.1.2 d. SEO System Test Engineer						
8.4.1.2 c. SEO CM Administrator						
8.4.1.2 b. SEO System Administrator						
Total MM = 360.4 MM	5.6					

Table K-4. ILS Staffing Plan (Headcount)

MO_Mgt_ILS_608_Jan_98 Function	Jan-98	Apr-99	Jan-02	Jul-02	End of Contract Nov-02	
ILS (Admin, Logistics, Install, Prop.)	7.0	6.0	4.0	2.0		
ILS Maintenance Coordinator	2.0	2.0	2.0	2.0		
Total MM = 451.0 MM	9.0	8.0	6.0	4.0		

Table K-5. Justification for SEO Staffing Changes

Position	Summary Basis of Estimate/Rationale
M&O Management	M&O management and administrative assistants for other than the SEO are shown in Table K-1.
SEO SW Maintenance Engineer	DID 608 (Jul-95) staffing: 16.0, Jan-98 through Mar-98; 15.0, Apr-98 through Aug-98; 6.0, Sep-98 through Sep-99; 9.0, Oct-99 through Oct-02 DID 608 (Jan-98) staffing: 15.0, Jan-98 through Sep-99; 12.0, Oct-99 through Dec-00; 10.0, Jan-01 through Oct-02. The revised staffing is intended to better fit the SW maintenance staffing to the mission launch profile, rather than to solely the release dates.
ILS Positions	These positions are now shown in Table K-4.
Mods 52 and 61 Impacts (Table K-3)	DID 608 (Jan-98) staffing: See Table. These staffing increases are tied to additional labor necessary to support non-ECS contractors with operational responsibility at LaRC (Mod 52), NSIDC (Mod 61) and JPL (Mod 61).

Table K-6. Justification for ILS Staffing Changes

Position	Summary Basis of Estimate/Rationale
ILS (Admin., Logistics, Installations, Property) Staffing shown in SEO table in Jul-95 version of DID 608	DID 608 (Jul-95) staffing: 6.0, Jan-98 through Oct-02. DID 608 (Jan-98) staffing: ILS: 7.0, Jan-98 through Mar-99 ILS: 6.0, Apr-99 through Dec-01 ILS: 4.0, Jan-02 through Jun-02 ILS, 2.0: Jul-02 through Oct-02 ILS management has just completed a revised staffing analysis. Higher staffing in the 1998/1999 period is expected to be required due to the need to install and relocate HW based on the post-launch procurements. Staffing is reduced after Dec-01 based on evolving to a stable HW baseline.
ILS Maintenance Coordinator Staffing shown in SEO table in Jul-95 version of DID 608	DID 608 (Jul-95) staffing: 1.0, Oct-96 through Dec-97; 3.0 Jan-98 through Mar-98; 4.7, Apr-98 through Oct-02. DID 608 (Jan-98) staffing: 0.0 throughout the period.

Appendix L. DAAC Staffing Models

The key ground rules and assumptions that apply to the staffing levels in this document are as shown in Table L-1. Using that process, staffing requirements at all sites were revisited.

In large measure, many of the changes were made to standardize staffing profiles relative to ECS activation and launches. There were, however, several changes made based upon revised operations concepts or models. Descriptions of these changes are shown in the following subsections.

Table L-1. Key Ground Rules and Assumptions

Topic	Assumption
Period of performance	01-Oct-1996 through 31-Oct-2002.
Release schedule	Table L-2 shows the release schedule.
Mission and instrument baseline	Table 5-1 shows mission and instrument baseline.
COTS baseline	Release A CDR and Release B CDR HW and SW COTS baselines as adjusted by the ECS HW Tiger Team.
Source lines of code	No impact.
Hours of operations	Table 5-2 shows the hours of operations.
Data volumes	Table L-3 shows the data volumes from the Feb-96 Technical Baseline.
Algorithms	Table L-4 shows the number of algorithms from the Feb-96 Technical Baseline.

Table L-2. ECS Release Schedule

Release	Consent to Ship Review	Release Readiness Review
A	02-Oct-96	02-Dec-96
B	01-Jun-97	01-Sep-97
C	01-Oct-99	01-Nov-99
D	01-Sep-01	01-Oct-01

Table L-3. Data Volumes

Date	DAAC Data Distribution (MB per day)					
	ASF	EDC	GSFC	JPL	LaRC	NSIDC
1-Jan-96	0	0	0	0	0	0
1-Jan-97	0	0	0	0	0	0
1-Apr-97	0	0	0	0	0	0
1-Jul-97	39,774	0	1,898	0	5,659	0
1-Oct-97	39,774	0	1,898	0	5,659	0
1-Jan-98	39,774	0	27,155	0	12,128	0
1-Apr-98	39,774	139,400	27,155	0	12,128	0
1-Jul-98	39,774	446,090	394,050	0	83,437	15,996
1-Oct-98	39,774	469,783	394,050	0	103,272	15,996
1-Jan-99	39,774	480,243	394,050	5,064	124,684	15,996
1-Apr-99	39,774	480,243	394,050	5,064	157,682	15,996
1-Jul-99	39,774	480,246	397,647	5,064	197,312	15,996
1-Oct-99	39,774	480,246	397,647	5,064	200,281	15,996
1-Jan-00	39,774	486,803	514,921	5,064	200,281	15,996
1-Apr-00	39,774	486,803	514,921	5,064	200,281	15,996
1-Jul-00	39,774	486,803	514,921	5,064	200,281	15,996
1-Oct-00	39,774	486,803	514,921	5,064	200,281	15,996
1-Jan-01	39,774	486,803	514,921	5,064	200,281	15,996
1-Apr-01	39,774	486,803	514,921	5,064	200,281	15,996
1-Jul-01	39,774	486,803	514,921	5,064	200,281	15,996
1-Oct-01	39,774	486,803	514,921	5,064	200,281	15,996
1-Jan-02	39,774	486,803	514,921	5,064	200,281	15,996
1-Apr-02	39,774	486,803	514,921	5,064	200,281	15,996
1-Jul-02	39,774	486,803	514,921	5,064	200,281	15,996
1-Oct-02	39,774	486,803	514,921	5,064	200,281	15,996

Table L-4. Number of Algorithms in ECS Technical Baseline (Feb-96)

Instrument Team	EDC	GSFC	JPL	LaRC	NSIDC
ASTER	8				
CERES				12	
DAO		4			
DFA-MR			6		
LIS					
MISR				11	
MODIS	12	38		1	4
MOPITT				6	
SAGE III				1	
SeaWinds			9		
Total	**20**	**42**	**15**	**31**	**4**

L.1 DAAC Archive Manager

The 7x24 staffing approach provides 1.0 person per day to monitor trends, plan long-term strategies, etc., for use of the archive. The DID 608 (Jul-95) approach had staff members on each operational shift, backed up by additional staff on weekday day shifts.

This reduction is justified by the level of automation and monitoring and life cycle services being provided by the data server and MSS COTS and custom SW components. Further, the NCAR facility in Boulder, CO, runs similar robotic archives and has not found a need for on-shift monitoring by a dedicated staff member.

L.2 DAAC Assistance Engineer

DID 608 (Jul-95) included this position included as a place holder against eventual transition of M&O responsibilities from the ECS Contractor to the DAACs. This has been deleted from the staffing plan but will be addressed in response to DAAC transitions such as the one at LaRC.

L.3 DAAC Computer Operator & DAAC System Administrator

System Administrator positions in the 7x24 staffing approach is based on 1 SA for every 25 computers (including the office environment). In addition the 7x24 staffing approach implements 7 days/week, 24 hours/day by adding a computer operator to support the on-shift Resource Manager, Production Monitors, and Ingest/Distribution Technician and to perform system backup and other administrative tasks.

L.4 DAAC Data Specialist

The 7x24 staffing is based on 1.0 staff member per instrument team shown in Table L-3 (exception: 1.0 MM/Mo. for both MOPITT & SAGE III) plus 1 for TSDIS at GSFC.

L.5 DAAC Ingest/Distribution Tech.

In support of the development and refinement of the ECS Release B Operations Concept, three "Day_in_the_Life_Models" were developed:

- Day_in_the_Life_Product_Generation
- Day_in_the_Life_User_Access
- Day_in_the_Life_Hard_Media

These models were briefed at Jan 17-19, 1996, Operations Concept Workshop (see day 1, "Day In The Life" briefing) and the results published in the ECS Operations Concept for the ECS Project: Part 2B - ECS Release B, DID 604, 604-CD-002-003, Mar-96.

The model of interest here is the "Day_in_the_Life_Hard_Media," (DILHM). DILHM is an Excel spreadsheet that uses a stochastic modeling approach to analyze operator and hardware actions for the distribution of hard media. The following assumptions were used in the model:

- 10 minutes per piece of media for the 1st piece in an order, 2 minutes for each additional piece.
- An e^x distribution was used to estimate the number of bytes in each order and to calculate the average number of orders per day.
- A minimum order of 100 MB was assumed.
- Half of the orders were assumed to go onto 500 MB (max. capacity) media and the remainder onto 4 GB (max. capacity) media.

DAAC representatives at the workshop recommended that the touch time be doubled. Analysis of this change showed there to be no appreciable impact to media distribution because the key factor in the media creation timeline is the time it takes to write/read the media - not operator time.

As a result, the staffing approach at EDC, GSFC, and LaRC was changed to 1 person per operational shift, rather than multiple personnel on a single shift. Staffing requirements at the other DAACs were much smaller because of the significantly lower data volume. As a result, media distribution is modeled as a part time job at those DAACs.

L.6 DAAC Science SW I&T Support Engineer

The estimated effort for SSI&T during the operational period considers three factors: the number of science software packages (algorithms) to be maintained (N), the frequency of algorithm updates (f, in updates per year), and the effort required to update each science software package (E, in staff-years). The staffing level (SL) required at a given DAAC is given by:

$$SL = N * f * E.$$

This is the same prescription as was used to estimate the SSI&T effort in the original ECS proposal. However, during the time which has elapsed since this proposal we have gained additional information and experience which now allows us to better estimate the factors utilized in this estimate.

L.6.1 Number of Science Software Packages

In our original estimates, we did not have a solid basis for counting the science software packages because the EOS Instrument Teams (ITs) had not yet developed their software designs. In lieu of such information, we estimated the number of science software packages by counting product levels and scientific disciplines served at each level.[4] Thus, for Level 2 processing, we estimated that there would be one CERES science software package (since CERES products characterize the atmosphere), but that there would be four MODIS science software packages (since MODIS has data products in all four of the scientific disciplines). On this basis, we estimated that there would be 79 science software packages, developed by the ITs and distributed across the DAACs as indicated in Table L.6.1-1.

Table L.6.1-1. Estimated Number of Algorithms in 1992 ECS Proposal

Instrument Team	DAAC				
	EDC	GSFC	JPL	LaRC	NSIDC
ACRIM		4			
AIRS		10			
AMSU		4			
ASTER	3		2		2
CERES				4	
EOSP		1		3	
HIRDLS		4			
LIS					
MIMR					
MISR				4	
MODIS-N	2	7			2
MODIS-T		7			
MOPITT				4	
STIK			4		
Total	**5**	**37**	**6**	**15**	**4**

[4] For Level 1 processing, we assumed two science software packages would be required (for Level 1A and Level 1B). For Levels 2-4, we assumed that one package would be required for each applicable discipline, where the identified disciplines were: atmosphere, cryosphere, land, and oceans.

Since this initial estimate was developed, there have been a number of changes. First, some instruments have been eliminated or deferred to later launches. Second, the assignment of instrument processing to the DAACs has been modified. And finally, the ITs have advanced their software designs to the point where the number of science software packages that each IT will require has been determined. The latter information has been collected by the Ad Hoc Working Group on Production (AHWGP), and captured in the Process Descriptions table in the ECS Technical Baseline (February 1996).

In using the referenced Process Descriptions, it is important to distinguish between processes and science software packages. For instance, the Process Descriptions table contains 64 Process IDs for CERES, but this represents only 12 separate CERES science software packages (subsystems in the CERES team's terminology). The difference represents multiple processing modes which utilize the same science software packages; this difference can be determined by examining the Process Name column of the Process Descriptions table. The same table also identifies the DAAC at which the processing (and, hence, the SSI&T effort) will be performed. The number of distinct science software packages in the Technical Baseline is 116, distributed among the ITs and DAACs as shown in Table L-4.

L.6.2 Frequency of Algorithm Updates

We initially estimated that algorithm updates will be performed twice per year during the first 21 months after launch, gradually decreasing to a frequency of once per year. Based on our subsequent interactions with the ITs, and considering their plans for validating and upgrading the algorithms, we now expect that updates will be much more frequent during the first year after launch. Initially, updates will be needing to: correct software errors, handle unexpected data conditions, adjust the algorithms to reflect calibration/validation results, and change ancillary data inputs as new data types (from other EOS instruments) become available. During this period (starting six months prior to launch), we expect that updates will occur approximately six times per year.

After the first year, algorithm updates should be less frequent, as the algorithms and data products stabilize. Although this is still difficult to accurately estimate, it is reasonable to expect that the frequency of updates should decrease by a factor of two (to 3 times per year) after the first year.

L.6.3 SSI&T Effort per Update

During 1996, we performed SSI&T on science software packages supplied by all of the EOS AM-1 instrument teams, which provides the basis for estimating the required effort for future SSI&T activities. In particular, we can use the experience with the MODIS SSI&T, where the science software was integrated with the COTS (AutoSys) scheduler. (For the other instruments, the software was ported to the IR-1 platform and run from the UNIX command-line environment, so these were not full integrations.) Our experience with the MODIS SSI&T shows that approximately one-quarter of a staff-month (*i.e.*, 0.25 / 12 staff years) is required to inspect, integrate and test each science software package. This is a significant decrease from our initial estimates, in part due to the excellent support received from the IT science software developers.

We might assume that less effort will be required for updates. However, the IR-1 experience involved integration only with the PDPS Scheduler. When we consider that future SSI&T efforts will include integration with the PDPS Planning Subsystem and the Data Server, 0.25 staff-month appears to be the best estimate for post-launch updates.

L.7 DAAC User Services Representative

Table L-5 shows the volume of science data archived each day at the DAAC. A model of 1.0 User Services representative per 100,000 MB but not less than 1.0 MM/Mo. (rounded to the nearest integer MM/Mo.) was used. This model was chosen because of experience that EDS has at its Plano, TX, data center. Their experience is that the number of users (and therefore demands on User Services) is roughly proportional to the amount data in a dataset. The value of 100,000 MB was derived by totaling the number of User Services personnel in previous versions of the staffing analysis under the assumption that the total, system wide, was roughly correct. Using the Technical Baseline values for archive

Based on the Government's comments against the Apr-97 version of this document, an analysis on complexity was performed. Figure L.7-1 shows, for a given instrument, the number of GB/day produced plotted against the number of products. There is a correlation coefficient of 89% in this data.

This suggests that volume and number of products are closely related during full production and that data volume is a reasonable predictor of complexity. However, should the volume of products be reduced without a corresponding decrease in the number of products, the effect of such complexity on staffing needs to be weighed by each DAAC.

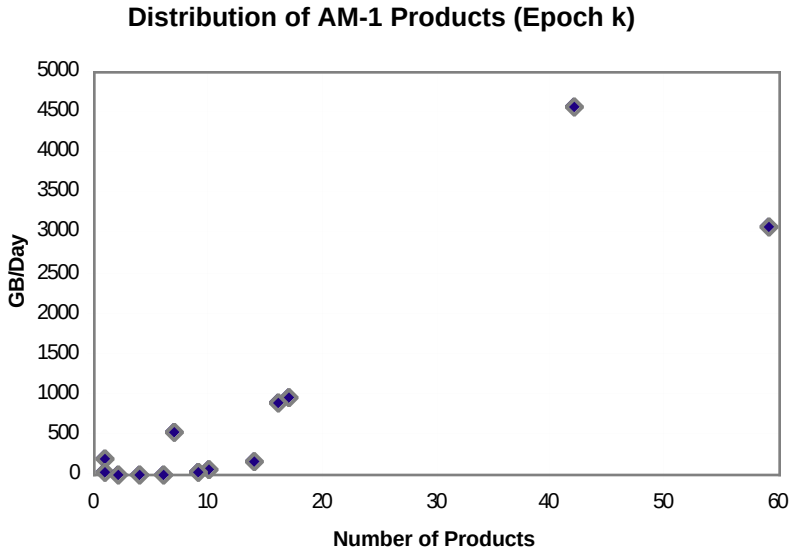

Figure L-7-1. Distribution of AM-1 Products (Epoch k)

L.8 DAAC V0 Data Migration Operator

The 7x24 staffing is consistent with the effort included in WBS 8 by Change Order 1. Labor was allocated to the DAACs to cover the periods of V0 data migration as described in the "Proposed ECS Plan for V0 Data Migration (Operations Phase)", 12-Aug-96. The staff at each DAAC was based on the volume of data to be migrated:

- ASF: 0.1 TB
- EDC: 13.0 TB
- GSFC: 10.0 TB
- JPL: 2.0 TB
- LaRC: 3.0 TB
- NSIDC: 0.1 TB

This results in staff being allocated at EDC, GSFC and LaRC. At the other DAACs, V0 data migration ingest will be handled by the remaining staff.

Abbreviations and Acronyms

7x24	7 days/week, 24 hours/day
ADC	Affiliated data center
AM-1	EOS AM Project spacecraft 1, morning spacecraft series — ASTER, CERES, MISR, MODIS and MOPITT instruments
A_O	Operational availability
ASF	Alaska SAR Facility
CCR	Configuration Change Request
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CIESIN	Consortium for International Earth Science Liaison Information Network
CM	Configuration Management
COTS	Commercial off-the-shelf
CSR	Consent to Ship Review
DAAC	Distributed Active Archive Center
DID	Data Item Description
ECS	EOSDIS Core System
EDC	EROS Data Center
EDF	ECS Development Facility
EDHS	ECS Data Handling System
EOC	EOS Operations Center
EOS	Earth Observing System
EOSDIS	Earth Observing System Data and Information System
EROS	Earth Resources Observation System
ESA	European Space Agency
ESDIS	Earth Science Liaison Data and Information System Project
ESN	EOS Science Liaison Network

FOS	Flight Operations Segment
FOT	Flight Operations Team
GSFC	Goddard Space Flight Center
I&T	Integration and test
ICD	Interface Control Document
ILS	Integrated Logistics Support
JPL	Jet Propulsion Laboratory
LaRC	Langley Research Center
M&O	Maintenance and Operations
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
NSIDC	National Snow and Ice Data Center
ORNL	Oak Ridge National Laboratory
RRR	Release Readiness Review
SAR	Synthetic Aperture Radar
SEDAC	Socioeconomic Data and Applications Center
SEO	Sustaining Engineering Organization
SMC	System Monitor Center
SOW	Statement of Work
TRMM	Tropical Rainfall Measuring Mission
WAD	Work Authorization and Delegation
WBS	Work Breakdown Structure